Analysis of Costs & Benefits: Results

Massachusetts Net Metering and Solar Task Force

Presentation - Task Force Meeting #11

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Overview

- Scenarios, Perspectives & Framework
- MW by Year for each Scenario
- C&B Results: Comparison by Perspective across Scenarios
  - NOP, CG, NPR, C@L
- Buildout under each Scenario by Subsector
- Benefit Cost Ratios
- Take-Aways & Observations
- Sensitivities
  - Framework extremes
  - Parametric variation
- Lots of Appendix Content

MODELING COSTS AND BENEFITS

LAY OF THE LAND: SCENARIOS & PERSPECTIVES

Scenarios Taxonomy:
Policy Paths Modeled

	Current Policy (SREC)		Option A (New Policy Start date: 1/1/17)		Option B (New Policy Start date: 1/1/17)	
Solar Incentive Features	10-year market-based SRECs with floor price auction		Small: 15 yr DBI/PBI Large: Competitive Bid for PBI		Small: 15-yr DBI/EPBI as Rebate Large: DBI/PBI	
Net Metering	Current Approach, Rate Structure		Reduced Value for Excess MWh		Current Approach, Rate Structure	
	Capped[4]	Uncapped	Capped[4]	Uncapped	Capped[4]	Uncapped
SREC-I,II	a	b	c[1]	d[1]	c[1]	d[1]
SREC-III	e[2]	N/A	-	-	-	-
New Policy	-	N/A	g[3]	h	i[3]	j
New Policy Solar Target (MW)	1,600/2,500	1,600	1,600/2,500	1,600/2,500	1,600/2,500	1,600/2,500

1. SREC-II truncated at 12/31/16
2. Starts when 1,600 MW is reached
3. Ignores very small quantity of cap space expected to be available in 2017 (~ 25 MW)
4. Remember, NM Capped ≠ NM Eliminated: when capped, small systems can still net meter, and sized-to-load still avoid retail value
Large-scale CSS, Offsite Low Income as we know them no longer viable once NM capped

Perspectives Considered:
One entity's cost may be another's benefit!

- Costs & benefits considered from perspective of…
  - The Customer-Generator (CG)
  - Non-Owner Participants (NOP)
  - Non-participating Ratepayers (NPR)
  - Citizens of the Commonwealth at Large (C@L)

"Participants"

Participants			NPR: Non-participating Ratepayers (within MA)	C@L: Citizens of MA at Large
NOP: Non-Owner Participants	**GC:** Customer-generator = **Owner** (includes host-owned (HO) and 3rd-party-owned (3PO)			
• Communities hosting PV • NMC off-takers • PPA hosts • VNM hosts	Sized-to-load generation (Physically consumed on-site + Excess generation to grid that is offset during billing month)	NM (beyond billing month) + VNM = (i) 100% "free-standing" + (ii) BTM generator's excess production to the grid + (iii) Wholesale generators		**Sum** of all in-state participants and in-state non-participants

- Note: *If all C & B quantified* ➔ all costs are captured except $ flowing out of state
- CGs treated as in-state entities, but $ flow to owners & lenders both in- and out-of-state, and $$ spent on equipment and labor both in- and out-of-state

Balancing Two Frameworks

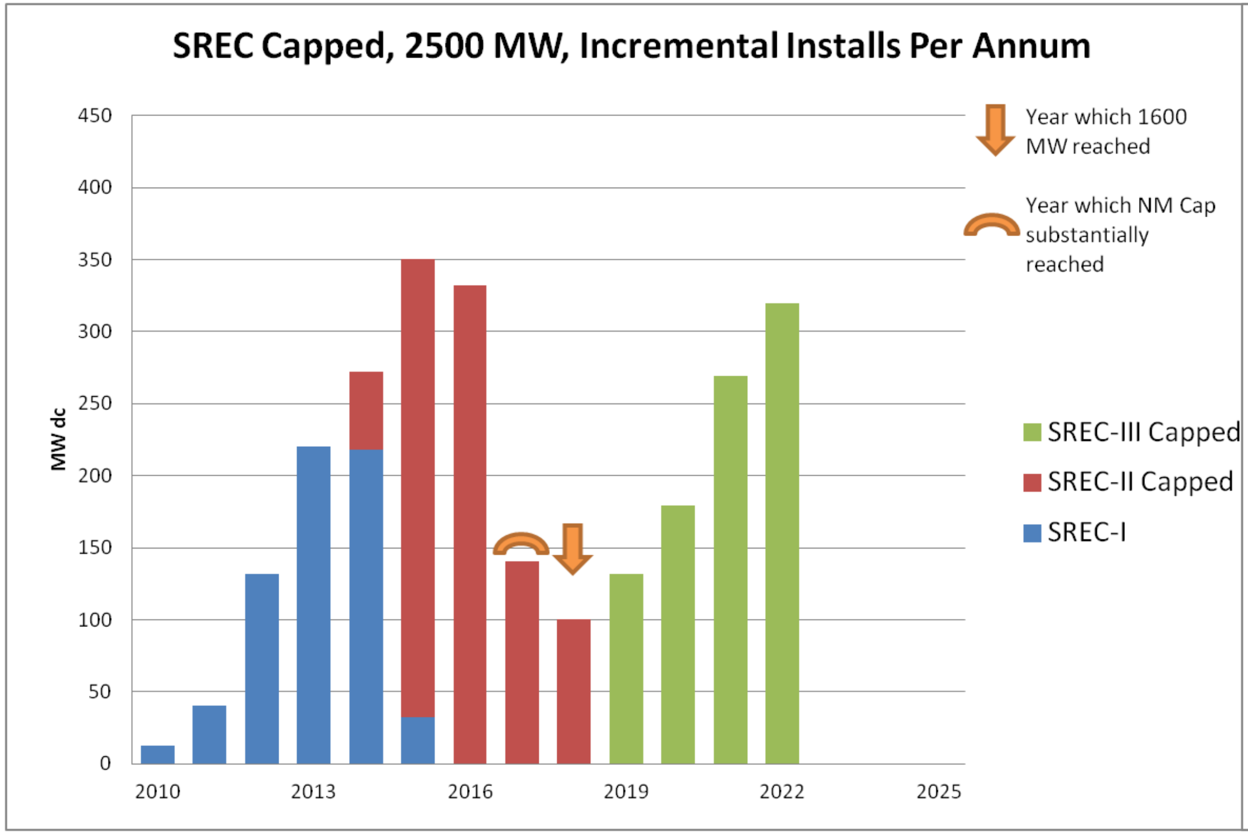
- Two alternative frameworks under Solar Carve-Out from Class I RPS
  - **Carve-out under Sufficient Class I Supply**: After 2018, MA solar displaces Class I RPS compliance met be land-based wind in absence of solar carve-out ➔ Low End of Impacts
  - **Solar as Incremental**: Inability to develop enough wind to meet Class I RPS, so MA solar displaced natural gas ➔ High End of Impacts
- What is impacted?
  - Market Price Impacts, emissions displacement, displaced RPS Class I Compliance Costs
- Base Assumption: **50%** weighting btw. Frameworks
- Sensitivities explored: 100% weighting to each framework

ANNUAL MW BUILD-OUT PROJECTIONS

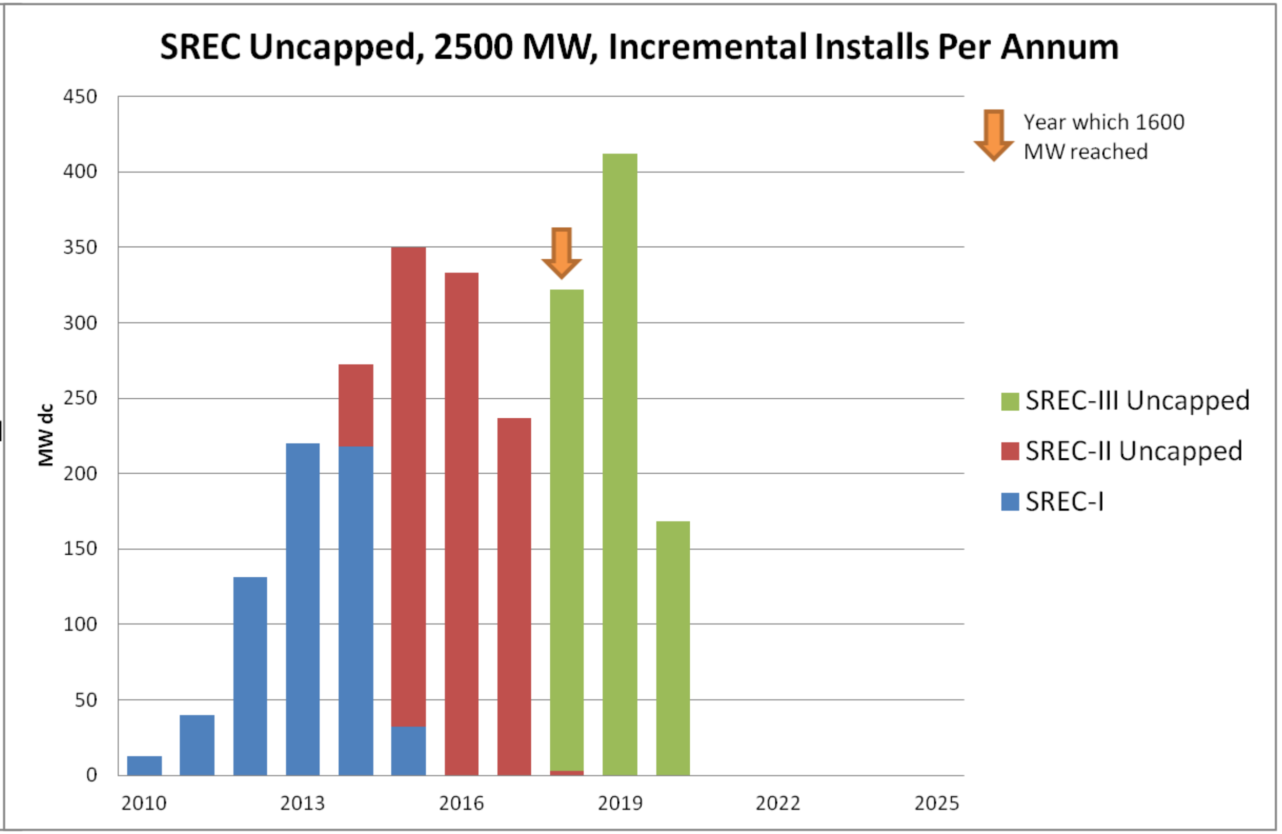
MW BY YEAR FOR EACH SCENARIO

SREC Policies:
Incremental MW dc Installs, By Program

Capped

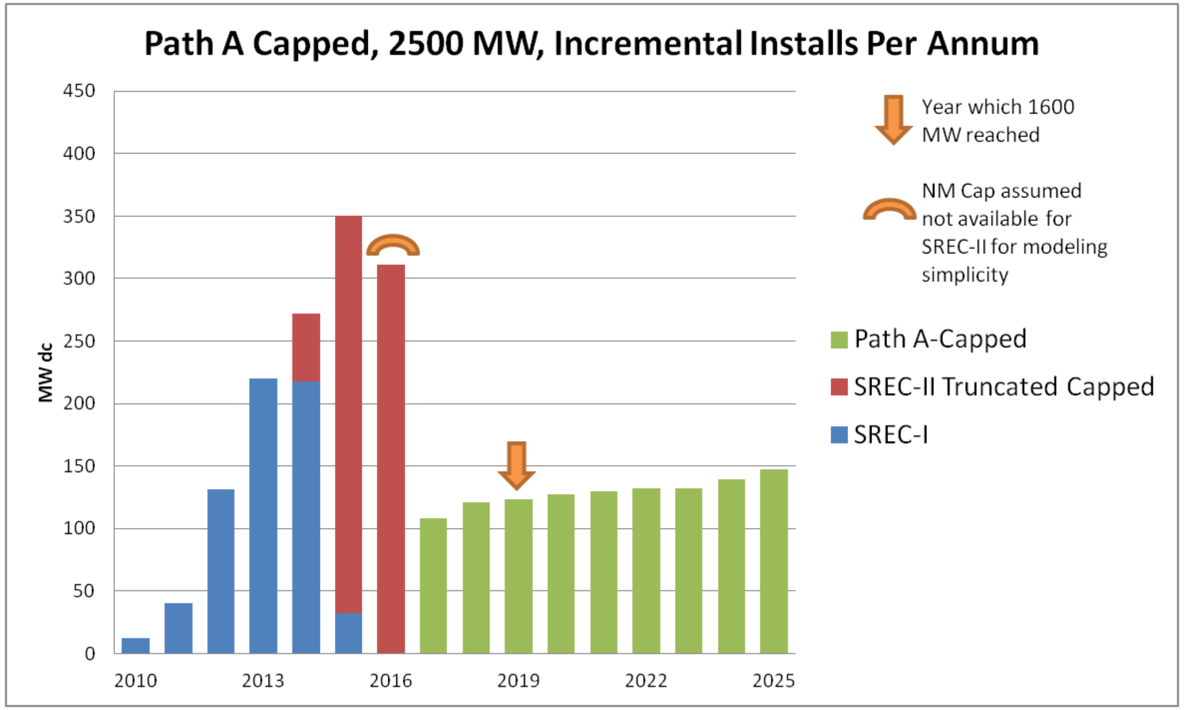


Uncapped

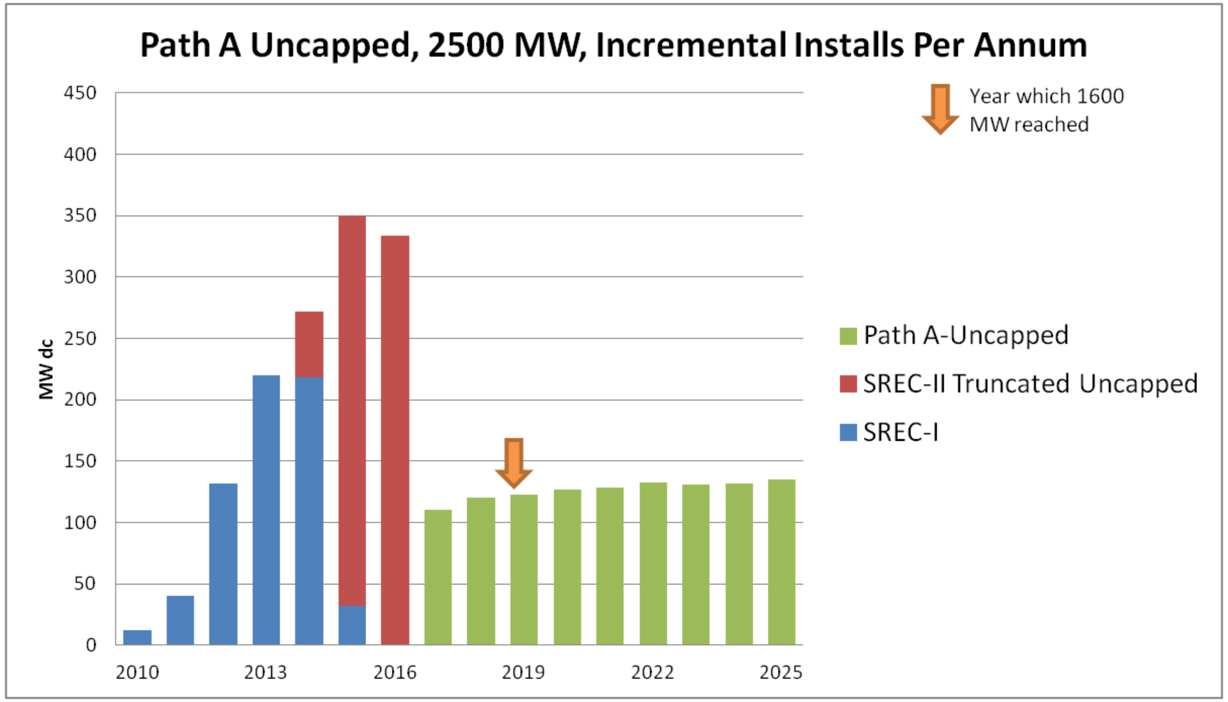


Policy Path A:
Incremental MW dc Installs, By Program

Capped

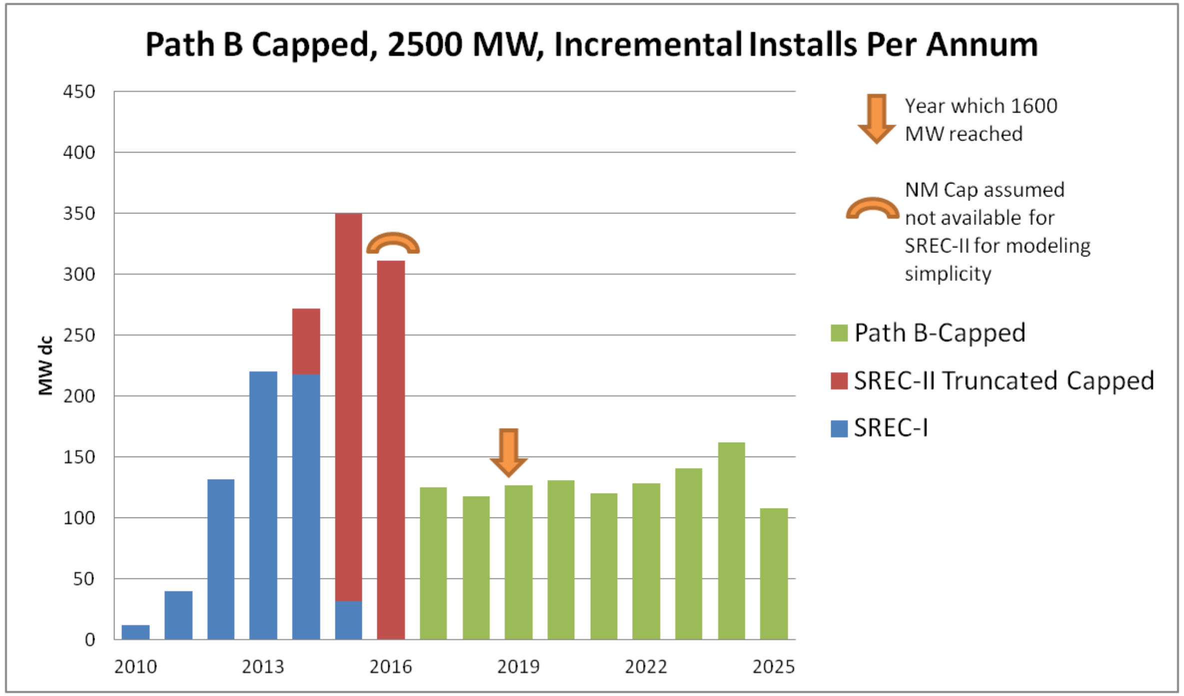


Uncapped

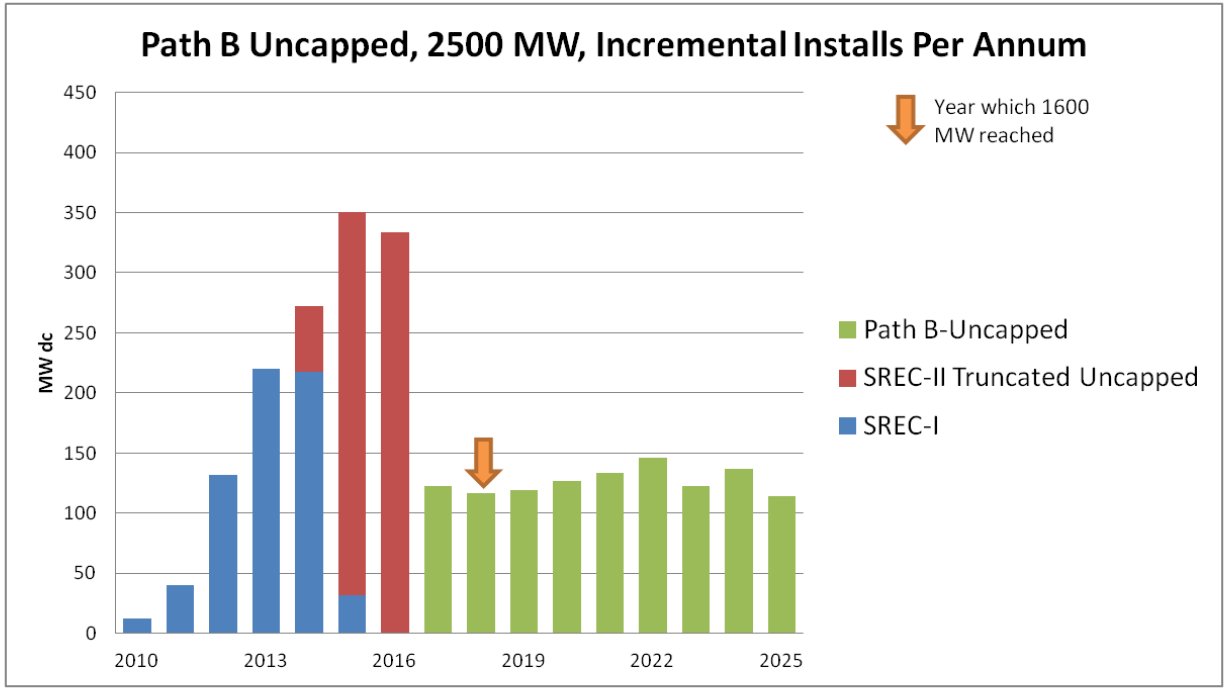


Policy Path B:
Incremental MW dc Installs, By Program

Capped



Uncapped



SREC Policies

- With current SREC policies in place & no increase in NM caps, MA could still reach 1600 MWs by (as early as) end of 2018; 2500 MWs (with SREC-III) in place as early as end of 2022.
- Under an uncapped SREC-III 2500 MW are reached as early as mid-2020 (~ 350 MW/year)
  - Adjustment mechanism "crashes" with this type of accelerated growth; puts SREC market in prolonged shortage
- SREC-II combined with net metering is having its intended affect of diversifying project types and offtakers compared to SREC-I which was primarily Managed Growth projects
  - Without net metering, there will be little diversity with residential/building mounted overtaking the market
- SREC-I is a sunk cost and very expensive as compared to SREC-II, and SREC-II would be more expensive than SREC-III
- The combination of VNM and SREC policies have provided more than enough margin to make MA a very attractive investment – so much so that it may be supporting unsustainable growth
- Loss of NM and ITC in short time frame to drive a spike followed by major contraction

Path A Small

- Path A Small is DBI/PBI program open to <= 25kW residential and non-residential customers and initially *combined incentives* were equalized across utilities. Also assume most systems are sized to load and participants are offsetting retail rates within the billing month. Further, these customers are exempt from net metering caps so no difference between capped and uncapped scenarios
- Needed incentive rates in 2017 range across EDCs from 12 ¢/kWh to 16 ¢/kWh for residential customers and from 6.5 ¢/kWh to 16 ¢/kWh for non-residential customers.
  - Reach retail rate ‘parity’ between 2020 and 2024
- Until rate parity is reached, controlled growth is possible if initial incentive and rate of decline closely track decline in needed incentive. But then growth accelerates as projects don’t need the solar incentives. If they don’t track closely, development could be volatile.
- Overall this type of program could be a viable method to have small customers participate in the solar market

Path A Large

- Path A Large is a DBI bidding program segmented by SREC-II Sectors B, C, D (MG)
- The availability of net metering (which only provides the "G" rate) makes a huge difference in program participation makeup
  - Without net metering, CSS and VNM LIH are cast out, and a portion of Sector A allocation goes to other Sectors. The LIH and CSS subsectors do not need additional solar incentives by mid 2019 if they have NM available, and dominate Sector A in this case
  - The other sectors still require incentives with or without net metering available, and all sectors require more solar incentives without net metering than with net metering
- With or without net metering the Competitive PBI framework is able to reach 2500 MW by 2025, and maintain a stable market
- Policy A Large and Small combined, can control market growth effectively while reaching the 2500 MW goal at ~14% lower costs to NPRs than SREC policy capped, while the capped SREC policy will have about ~16% more net benefits to C@Ls

Path B Small

- The Path B program is DBI with an EPBI provided as up front cash payment
- As net metering is available to all small participants regardless of net metering caps there is no difference between net metering capped and uncapped scenarios
- Needed incentive rates in 2017 range from $1500 to $2000/kW for residential customers and from $1200 to $2300/kW for non-residential customers.
    - These reach retail rate parity between 2021 and 2024
- Until rate parity is reached, controlled growth is possible if initial incentive and rate of decline closely track decline in needed incentive. But then growth accelerates as projects don't need the solar incentives. And other constraints will be needed to control growth if desired (for example, minimum bill)
    - If they don't track closely, development could be volatile.
- Overall this type of program could be a viable method to have small customers participate in the solar market, though the EPBI is a little more expensive than the PBI given our assumptions of perceived increased risk associated with a lump sum payment (need to confirm)

Path B Large

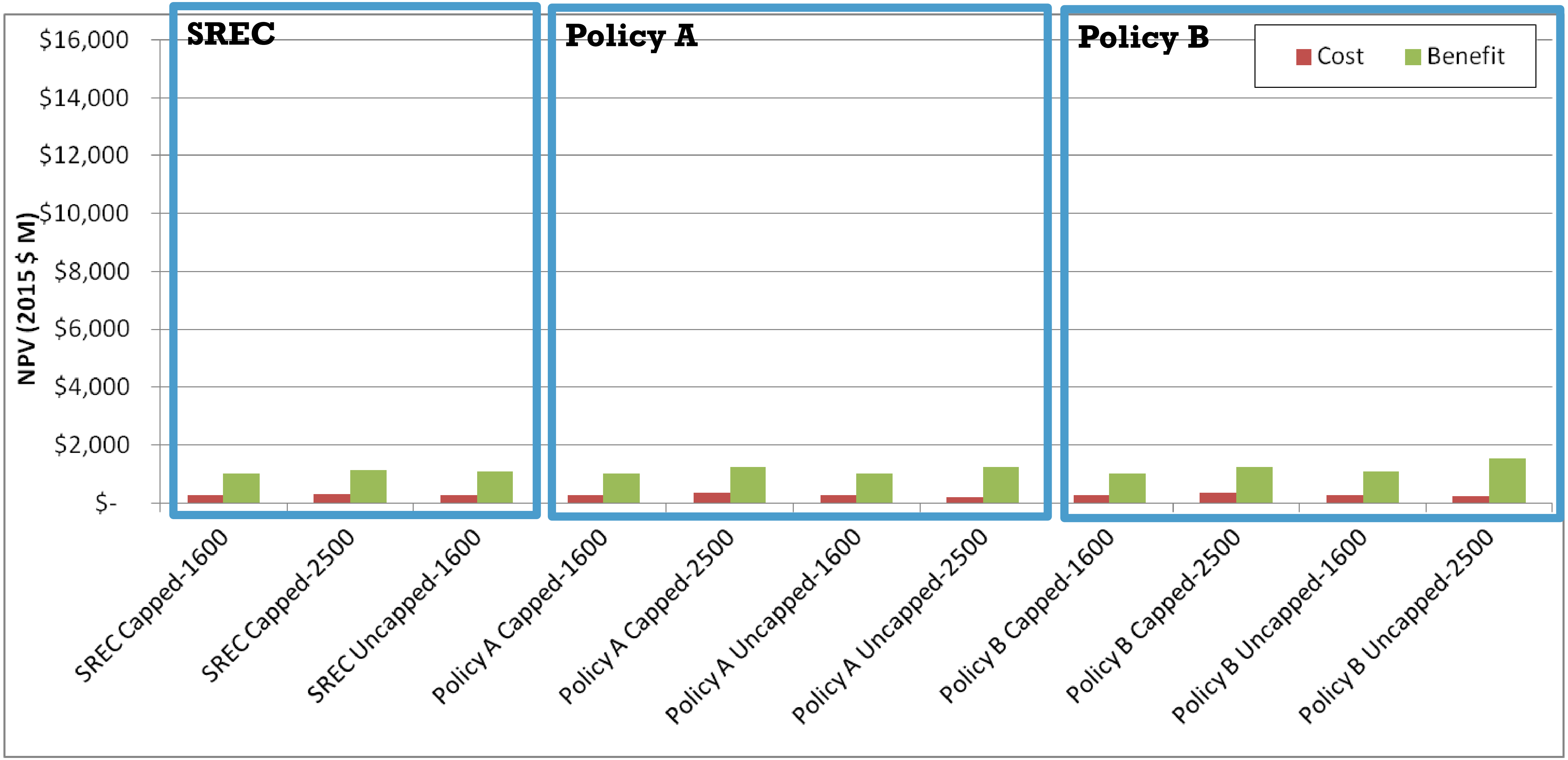
- Open market DBI/PBI incentive program.
- The availability of net metering (which provides the current rate components) again makes a huge difference in program participation makeup
  - Without net metering CSS and VNM LIH are cast out, and a portion of Sector A allocation goes to other Sectors.
  - The LIH and CSS of Sector do not need incentives as early as 2017 if they have NM available and dominate Sector A in this case just like Policy Path A, and (at projected rates of needed incentive decline) *growth can not be controlled* to stop hitting targets prior to 2025 (unless...)
  - Sector B, C, and D are similar to Sector A, but retail parity with solar incentives are not hit until later and growth can be controlled in the uncapped scenario.
- Without net metering all the sectors can be controlled and incentives decline over time
- The Path B capped combined small and large costs and benefits are similar to the Path A, while the Path B uncapped scenario has higher costs for NPRs offset by higher net benefits to C@L

COST & BENEFIT RESULTS

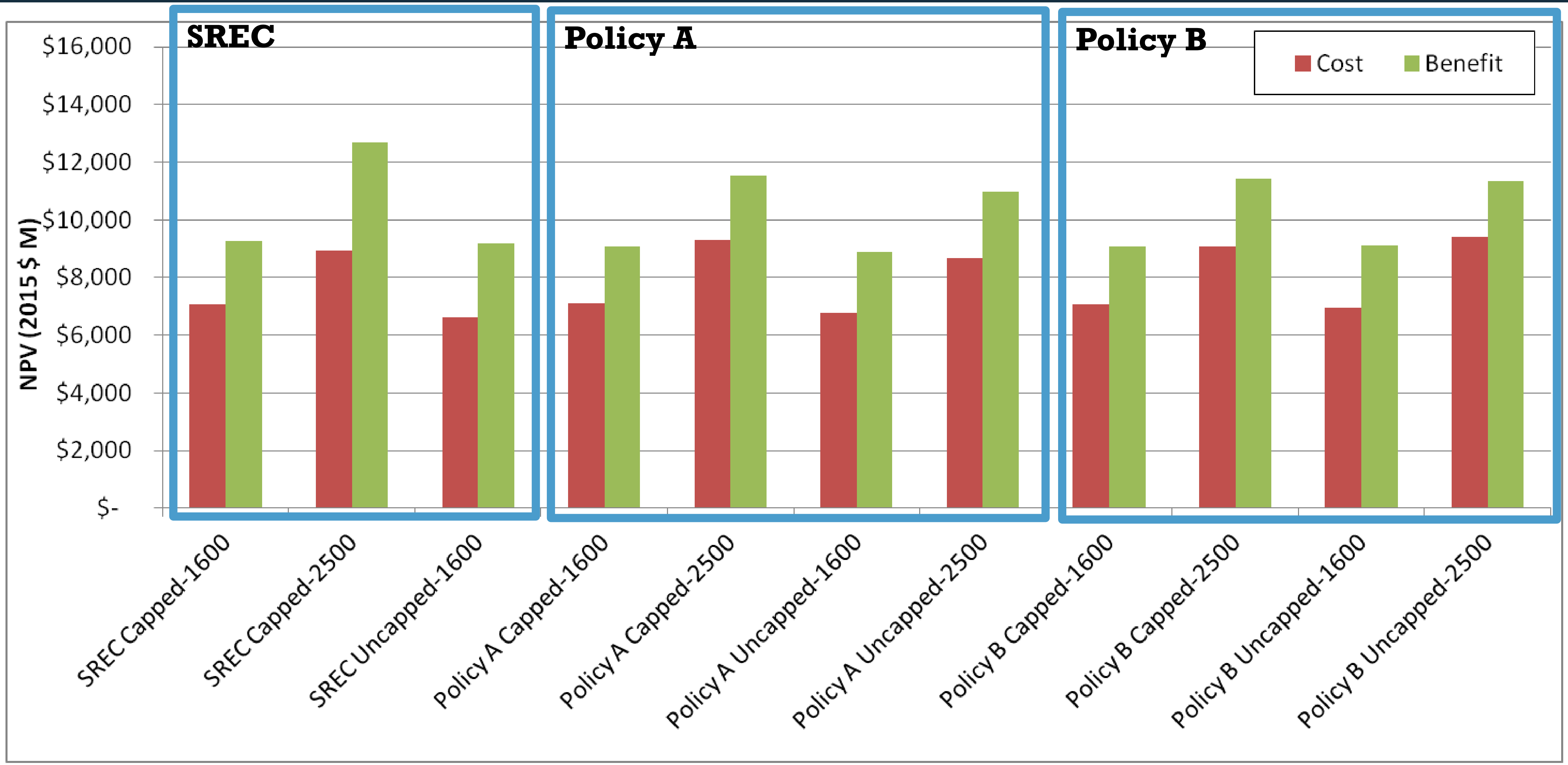
COMPARISON BY PERSPECTIVE ACROSS SCENARIOS

NOP
CG
NPR
C@L

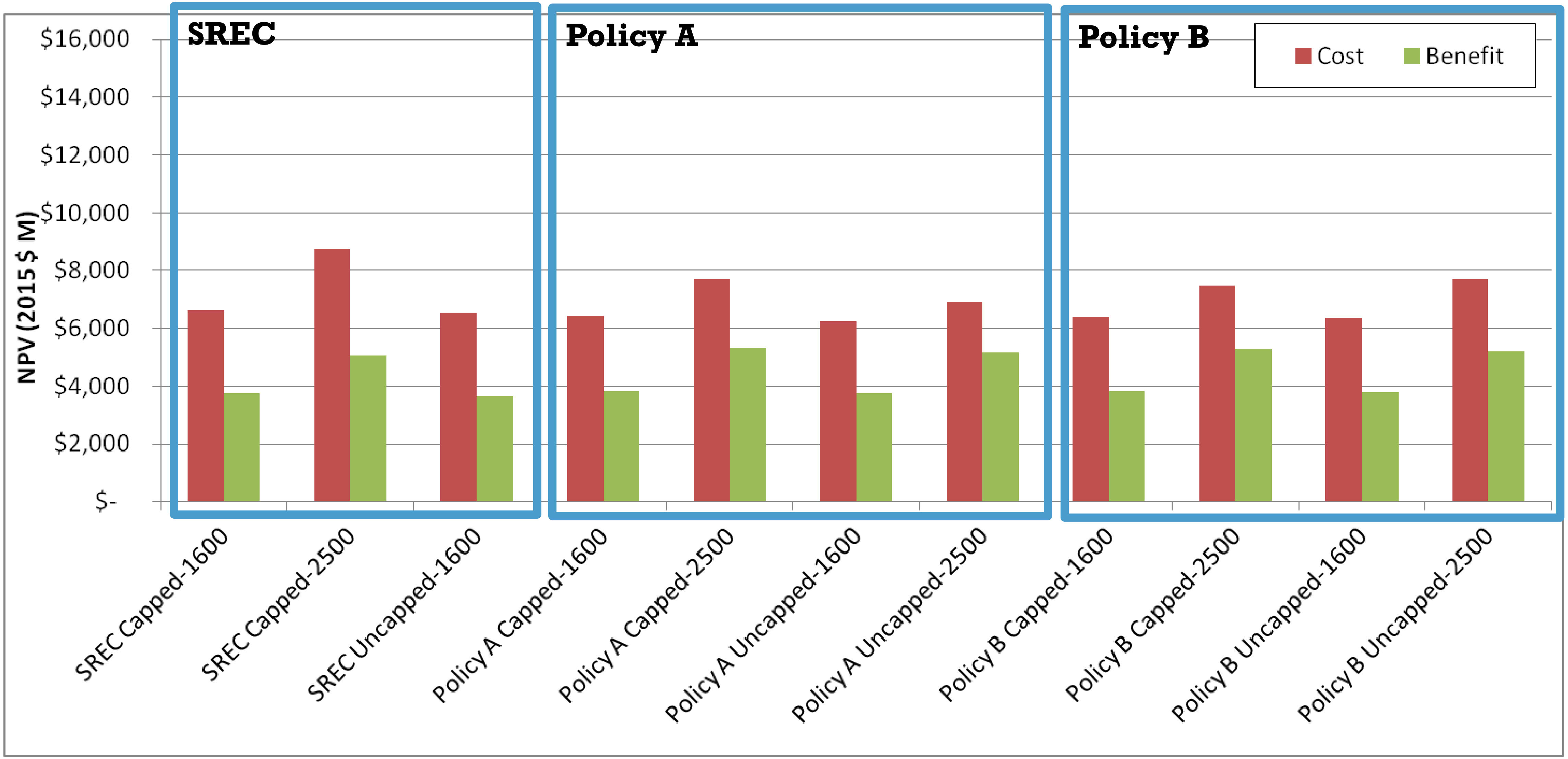
Total Costs & Benefits, NOP Perspective
NPV



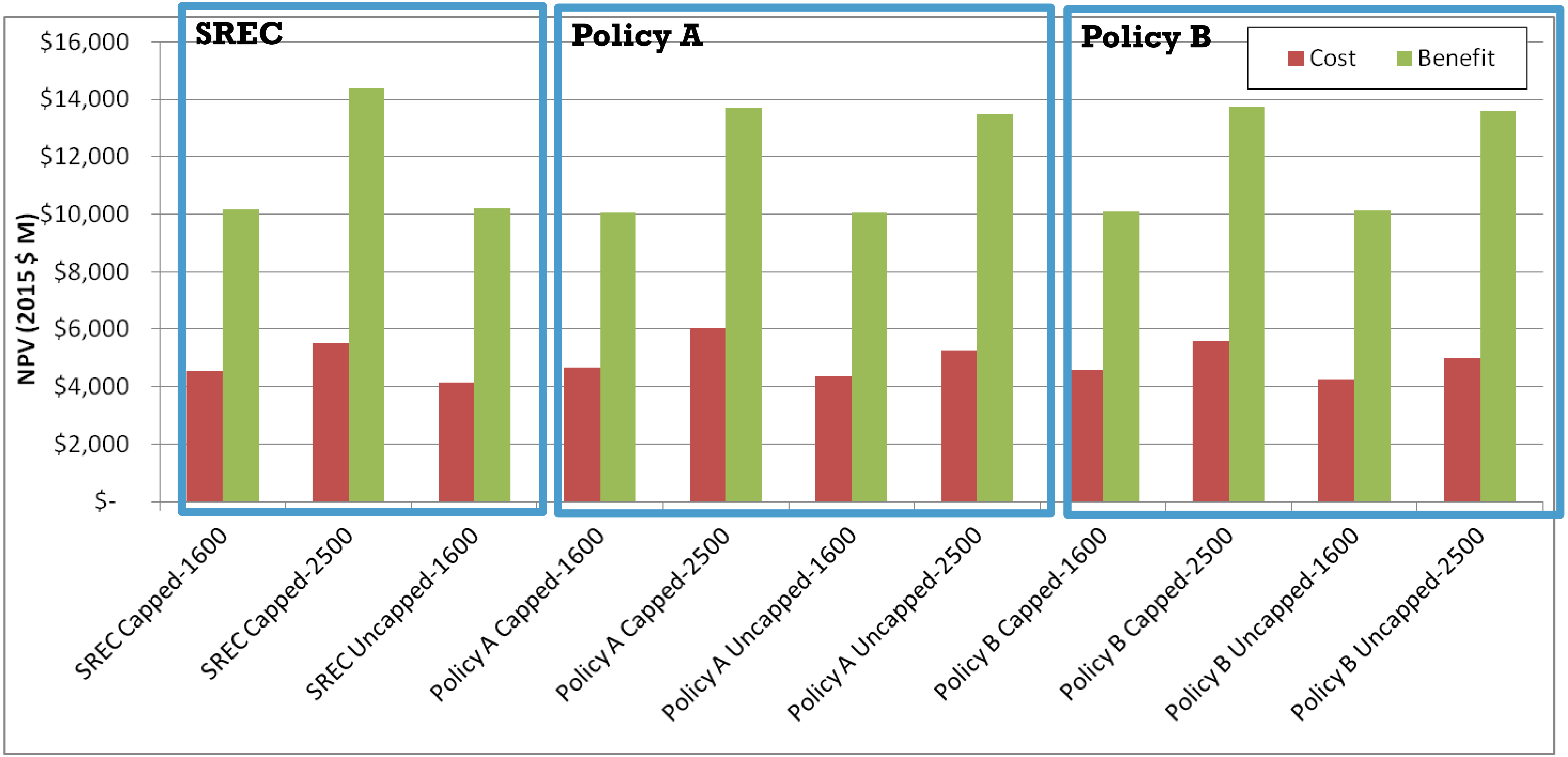
Total Costs & Benefits, CG Perspective
NPV



Total Costs & Benefits, NPR Perspective
NPV



Total Costs & Benefits, C@L Perspective
NPV

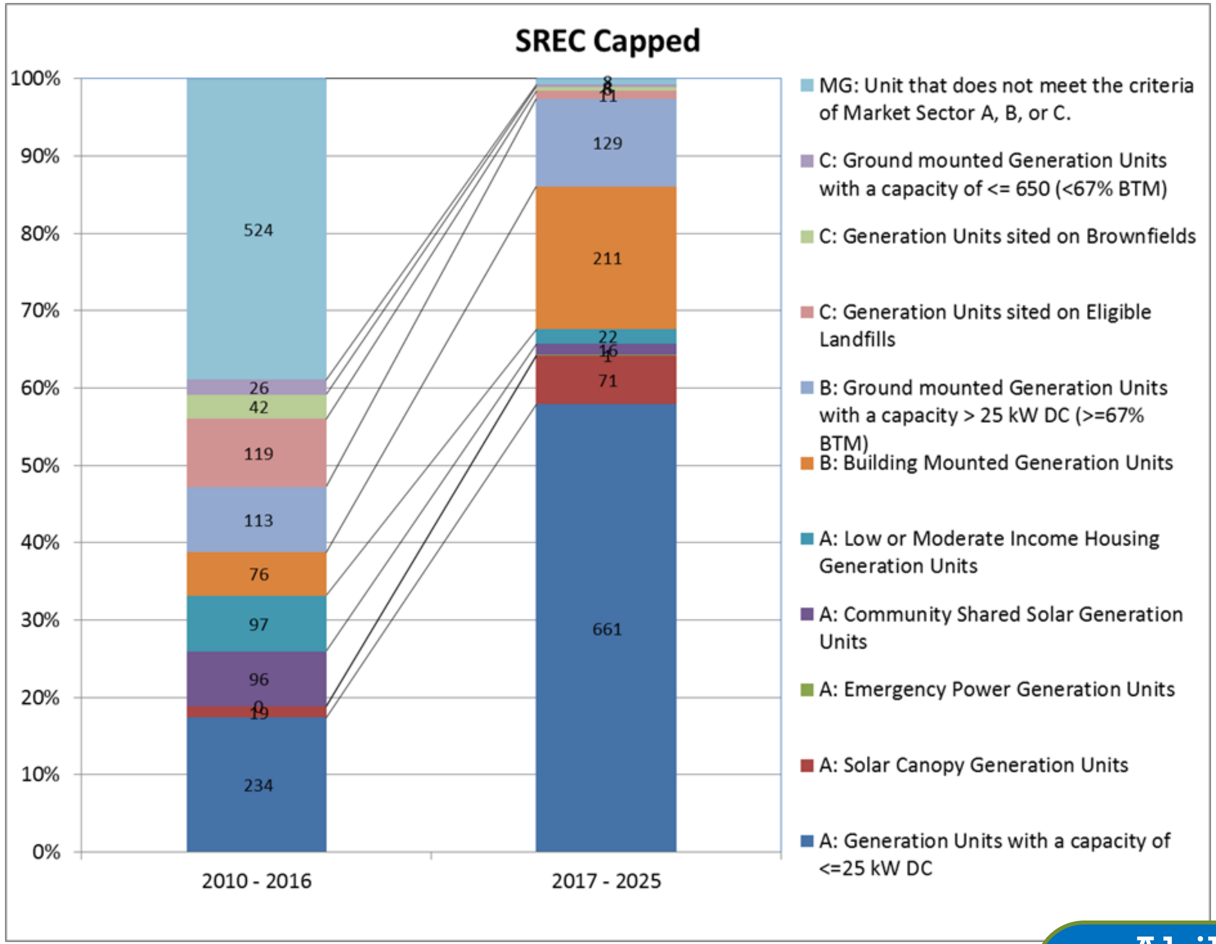


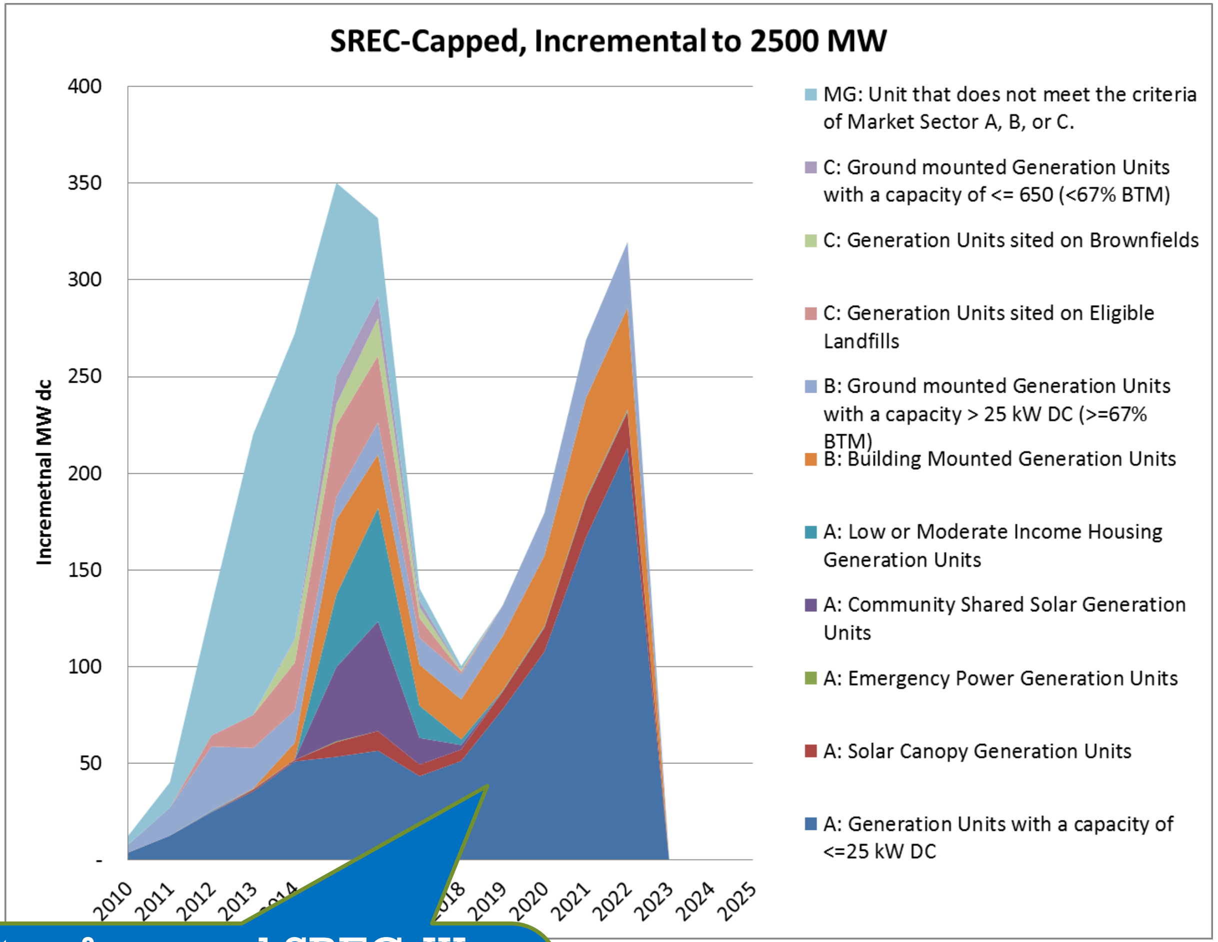
BUILDOUT UNDER EACH SCENARIO

BY SREC-II SUB-SECTOR

Build-out By Type (SREC-II Subsectors)

SREC, Capped, to 2500 MW

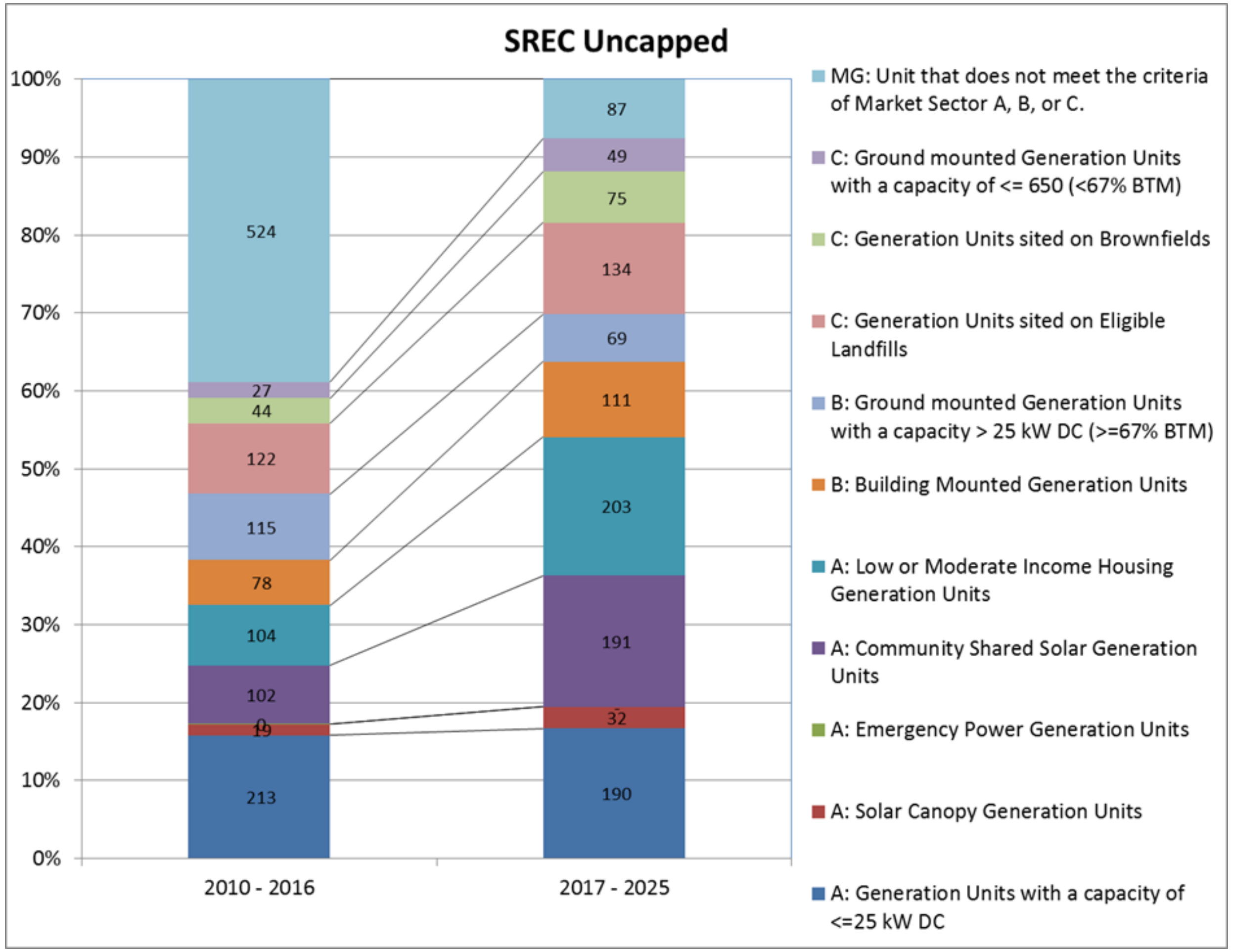


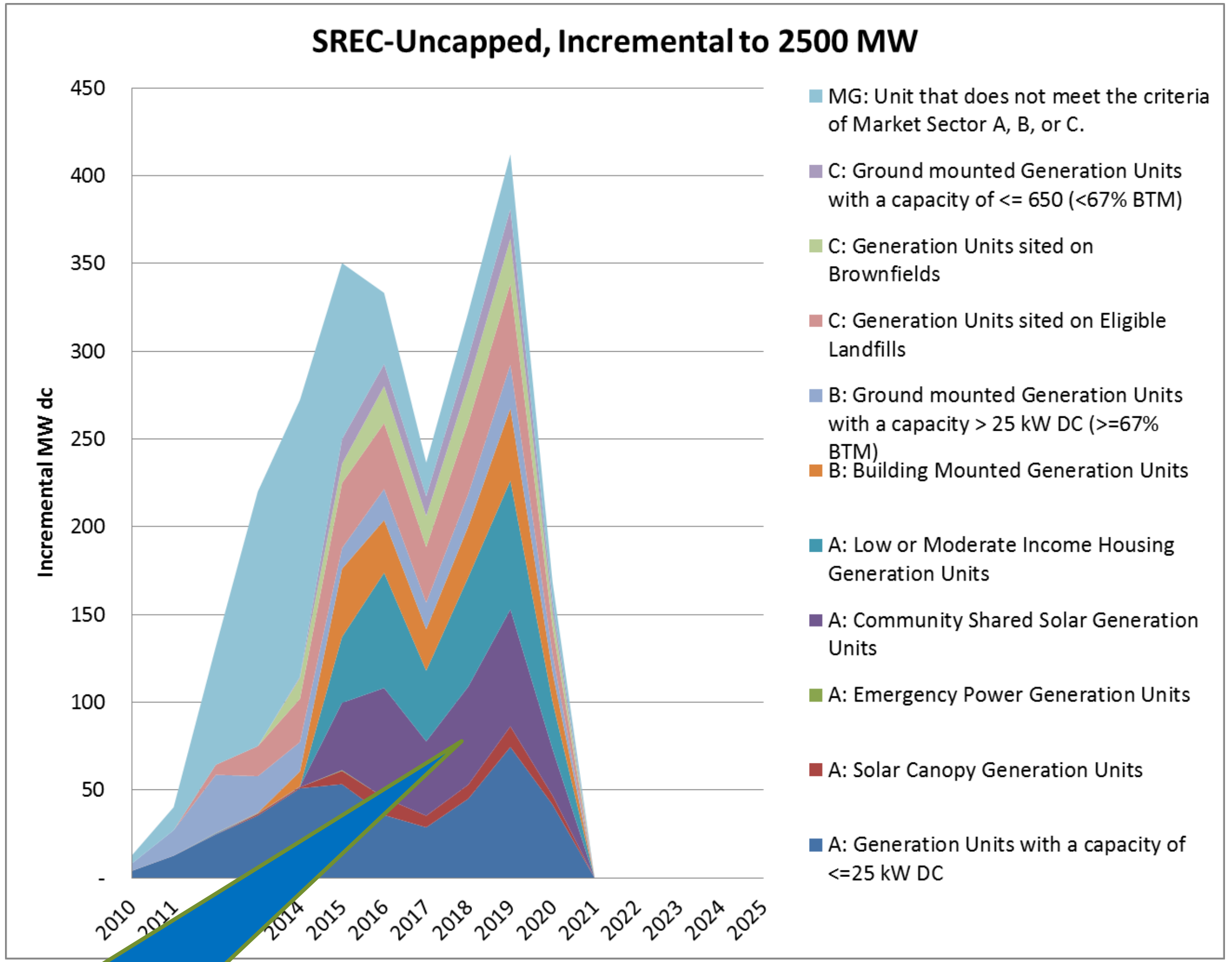


Ability of capped SREC-III program to hit targets contingent on growth of Res. Sector; can this sector have 4x growth for 2022 v. 2015?

Build-out By Type (SREC-II Subsectors)

SREC, Uncapped, to 2500 MW

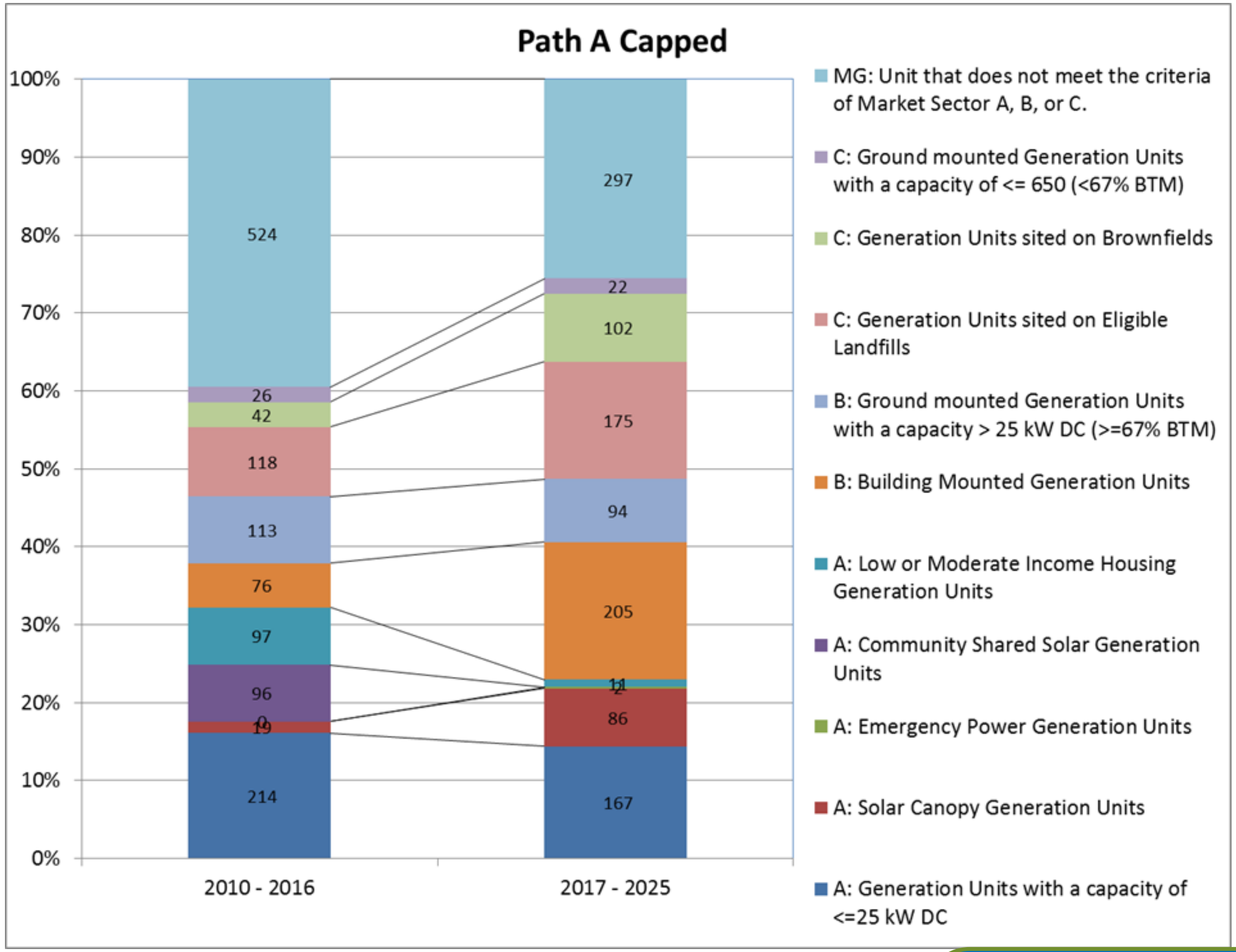


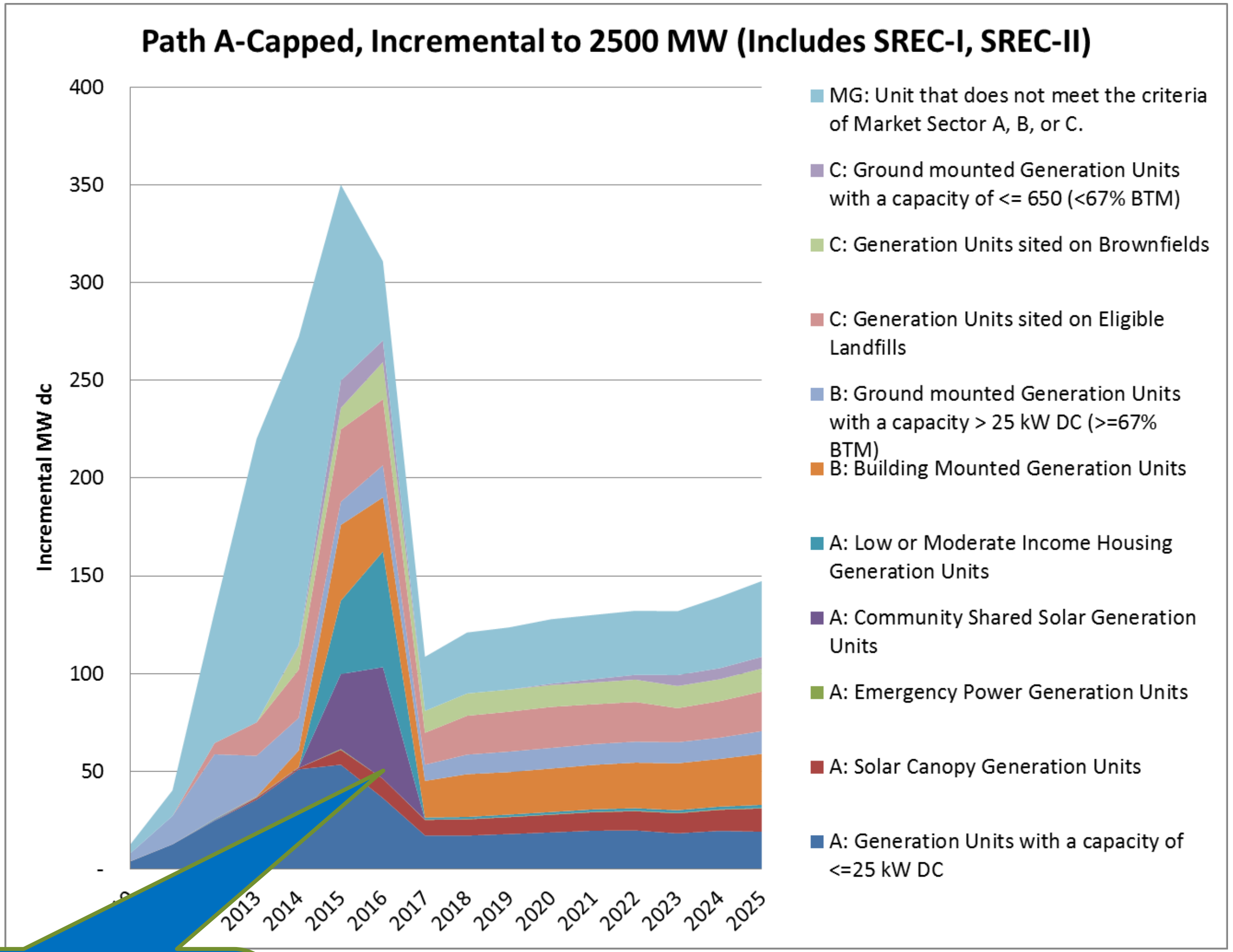


CSS and VNM LIH Dominate SREC-III Uncapped

Build-out By Type (SREC-II Subsectors)

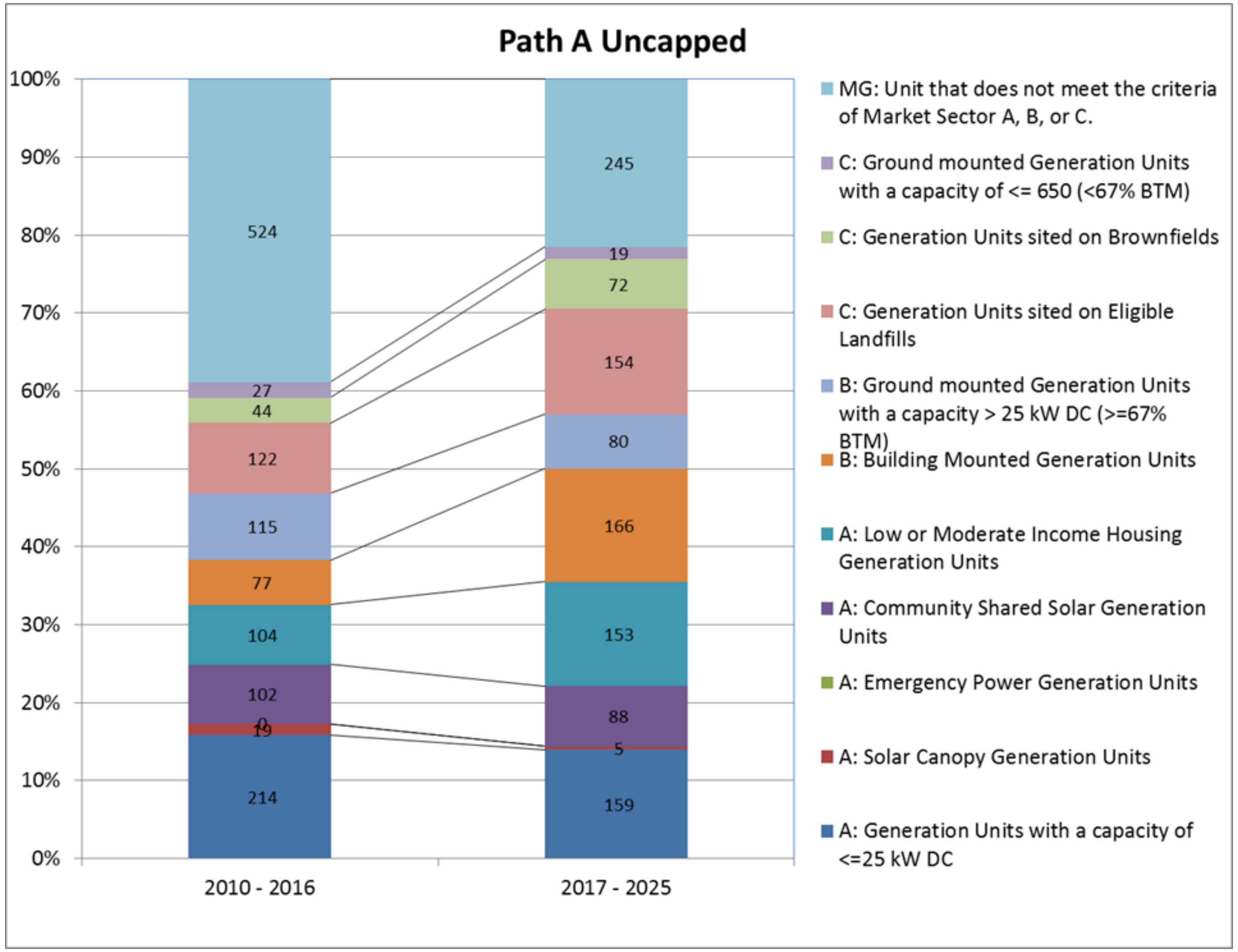
Path A, Capped, to 2500 MW

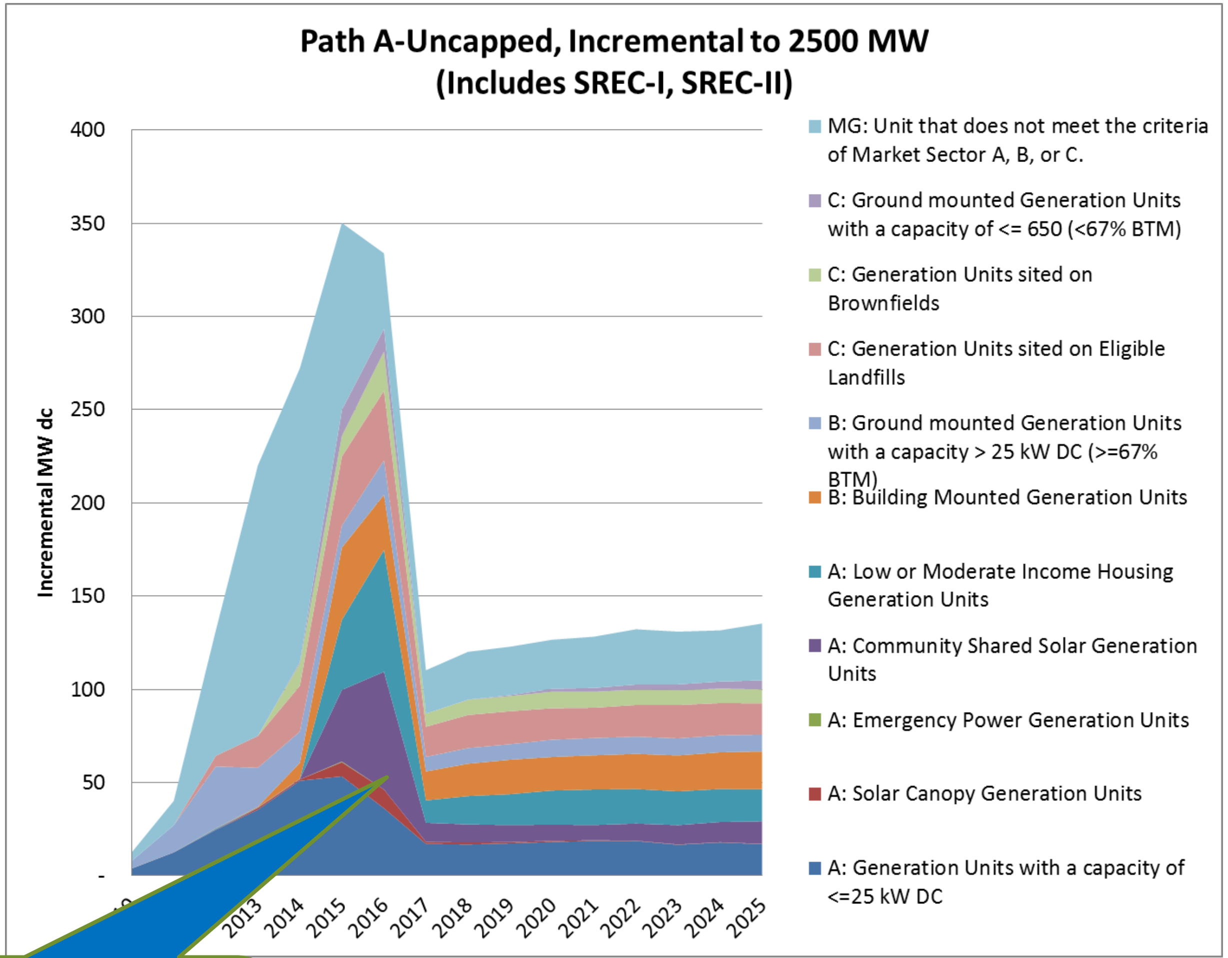




Engineered Growth Rate via quotas in Bid System, optimized curve of DBI, Small Sector.

Build-out By Type (SREC-II Subsectors)
Path A, Uncapped, to 2500 MW

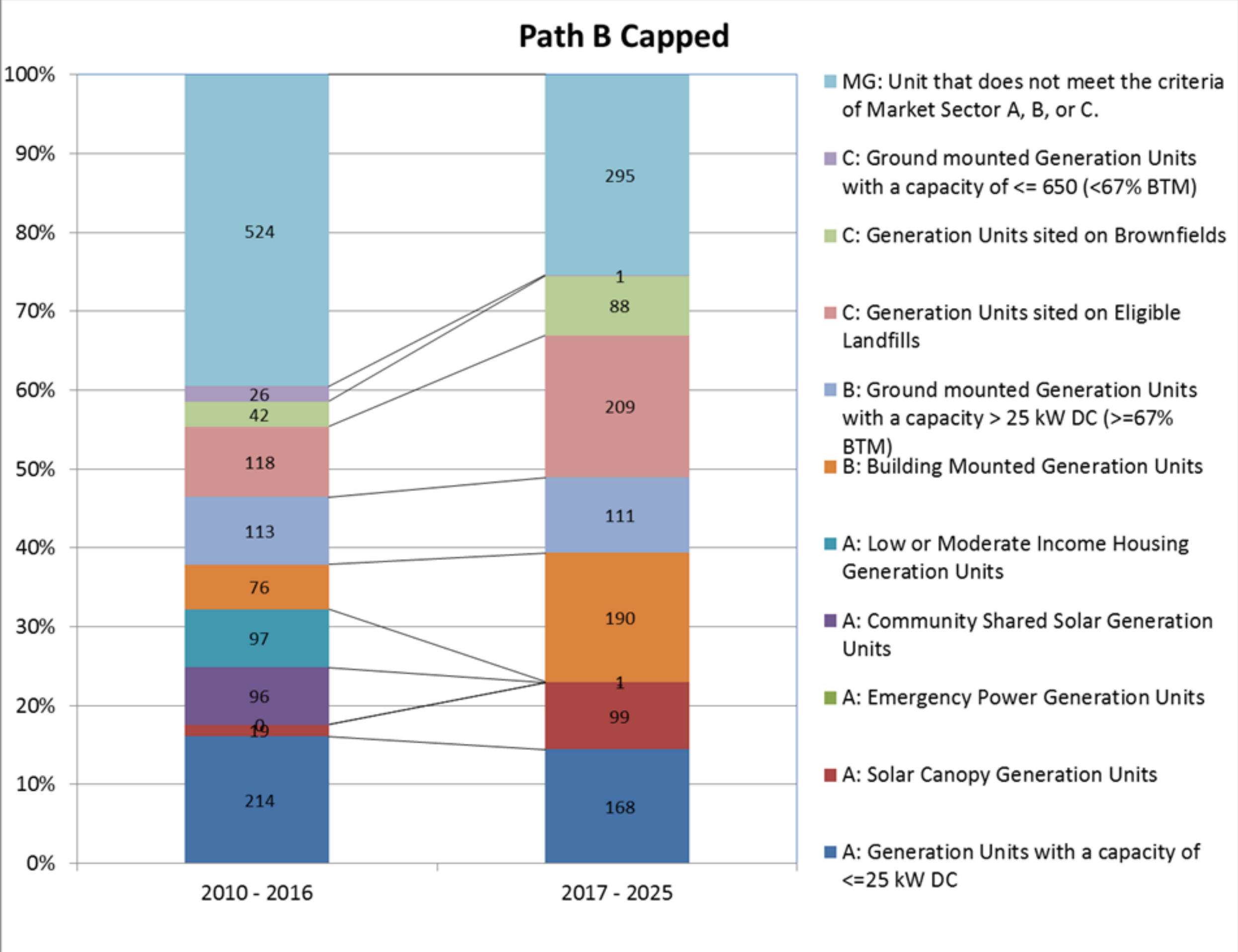


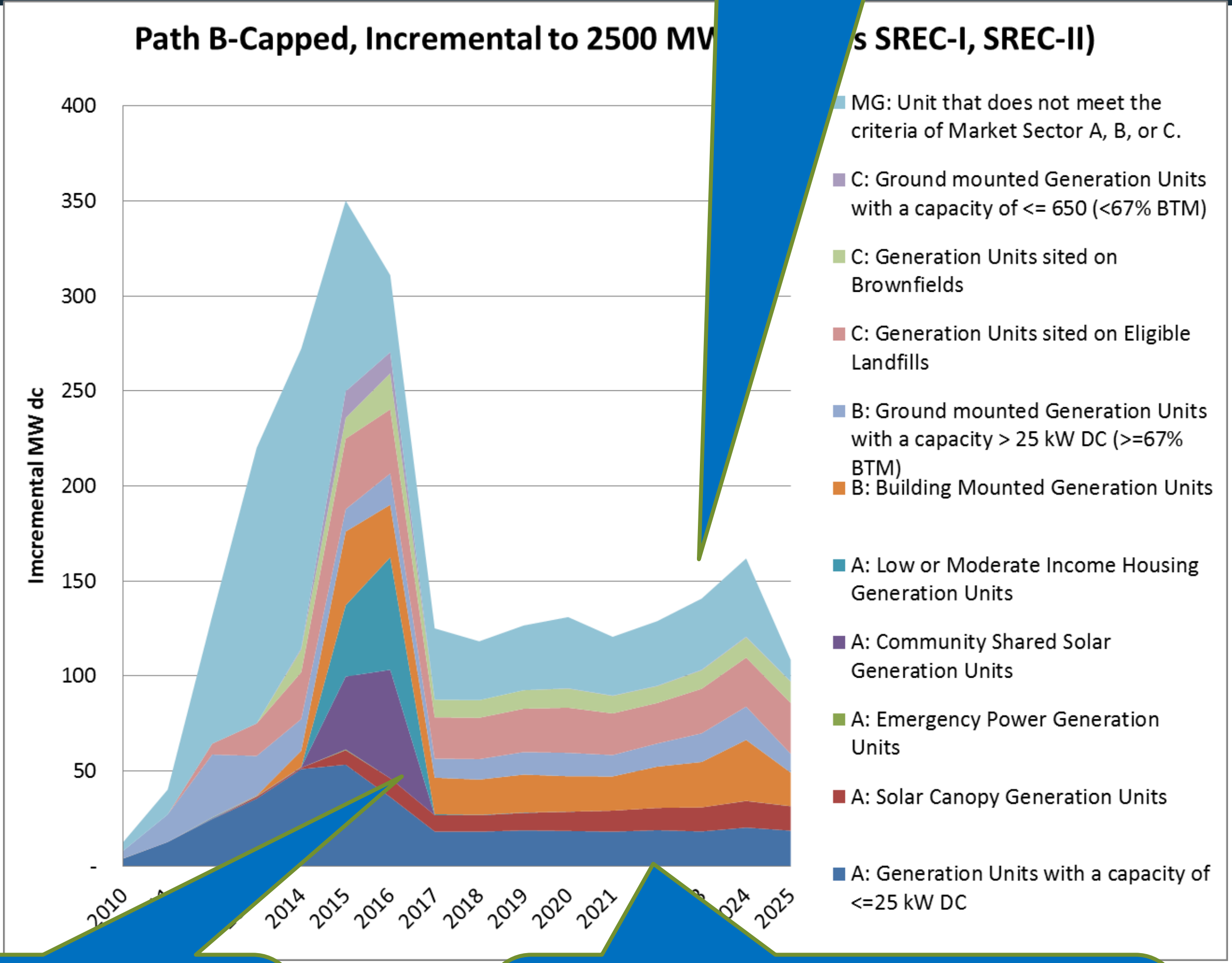


Engineered Growth via quotas in Bid System, optimized curve of DBI, Small Sector

Build-out By Type (SREC-II Subsectors)
Path B, Capped, to 2500 MW

Spike reflects growth @ $0 DBI/PBI needed



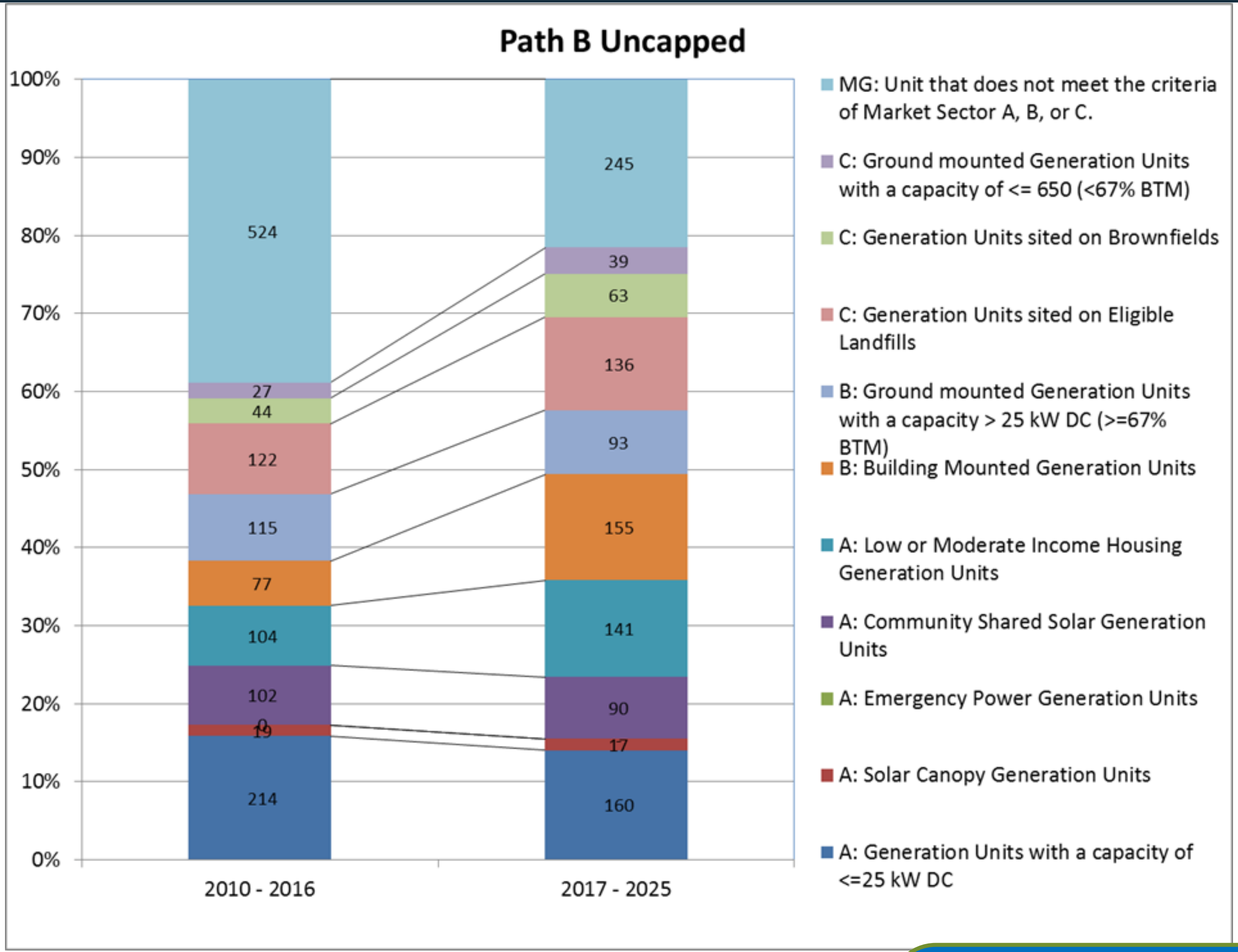


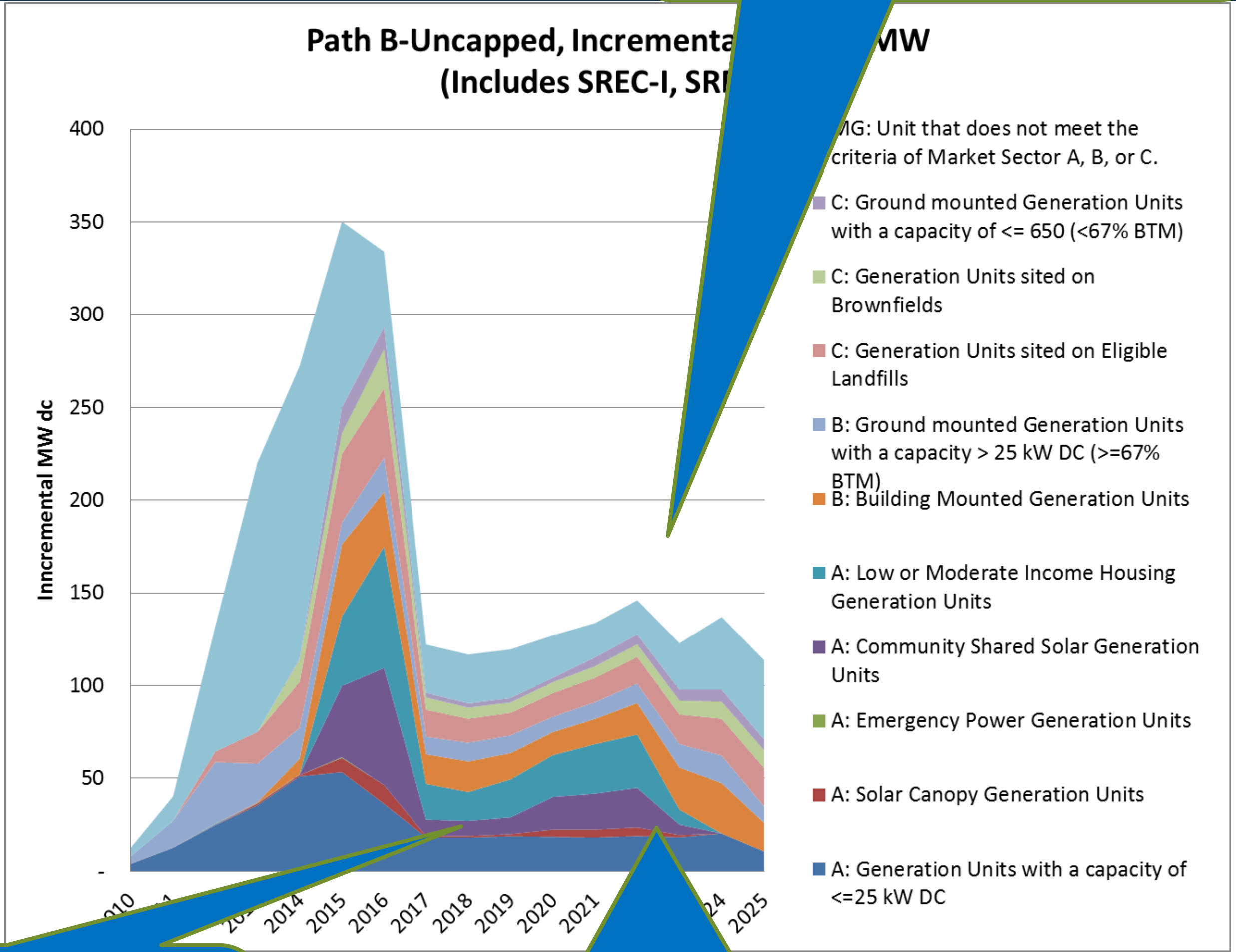
Engineered Growth via, optimized decline of DBI. Higher potential for volatility v. Path A.

Faux Decline: program hits target 2025-Q2 (installs actually growing at accelerated rate here)

Build-out By Type (SREC-II Subsectors)
Path B, Uncapped, to 2500 MW

Spike reflects growth @ $0 DBI/PBI (Completely NM Rate driven growth)



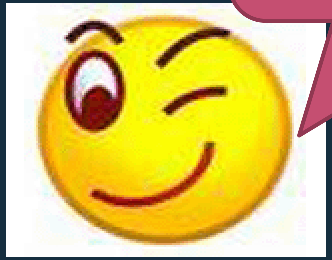


CSS/VNM LIH growth cannot be controlled in open enrollment system @ current NM Rates

Faux decline: program hits target 2025-Q2 (installs actually growing at accelerated rate here)

BENEFIT : COST RATIOS…
AND AN INDEX WE MADE UP JUST FOR YOU

QUANTIFIED COST BENEFIT NPVS AND RATIOS



The
"(NB(C@L):NC(NPR)"
Ratio)

SREC Policies

Capped

SREC Capped		2500 MW NPV	1600 MW NPV
NOP	NPV of Costs	$ 318.0	$ 280.9
NOP	NPV of Benefits	$ 1,127.1	$ 1,015.0
	B:C Ratio	3.54	3.61
CG	NPV of Costs	$ 8,931.6	$ 7,046.2
CG	NPV of Benefits	$ 12,668.0	$ 9,271.7
	B:C Ratio	1.42	1.32
NPR	NPV of Costs	$ 8,757.8	$ 6,625.1
NPR	NPV of Benefits	$ 5,047.8	$ 3,766.2
	B:C Ratio	0.58	0.57
C@L	NPV of Costs	$ 5,526.9	$ 4,528.0
C@L	NPV of Benefits	$ 14,358.2	$ 10,161.7
	B:C Ratio	$ 2.6	$ 2.2
NB(C@L):NC(NPR) Ratio		2.38	1.97

Uncapped

SREC Uncapped		2500 MW NPV	1600 MW NPV
NOP	NPV of Costs	#N/A	$ 284.9
NOP	NPV of Benefits	#N/A	$ 1,072.5
	B:C Ratio	#N/A	3.76
CG	NPV of Costs	#N/A	$ 6,631.2
CG	NPV of Benefits	#N/A	$ 9,168.5
	B:C Ratio	#N/A	1.38
NPR	NPV of Costs	#N/A	$ 6,559.9
NPR	NPV of Benefits	#N/A	$ 3,648.7
	B:C Ratio	#N/A	0.56
C@L	NPV of Costs	#N/A	$ 4,145.4
C@L	NPV of Benefits	#N/A	$ 10,187.5
	B:C Ratio	#N/A	$ 2.5
NB(C@L):NC(NPR) Ratio		#N/A	2.08

Policy Path A

Capped

Policy A Capped		2500 MW NPV	1600 MW NPV
NOP	NPV of Costs	$ 340.4	$ 279.0
NOP	NPV of Benefits	$ 1,239.3	$ 1,013.3
	B:C Ratio	3.64	3.63
CG	NPV of Costs	$ 9,312.3	$ 7,102.7
CG	NPV of Benefits	$ 11,540.0	$ 9,070.2
	B:C Ratio	1.24	1.28
NPR	NPV of Costs	$ 7,702.9	$ 6,451.3
NPR	NPV of Benefits	$ 5,316.3	$ 3,838.6
	B:C Ratio	0.69	0.60
C@L	NPV of Costs	$ 6,035.8	$ 4,667.9
C@L	NPV of Benefits	$ 13,721.1	$ 10,070.8
	B:C Ratio	$ 2.3	$ 2.2
NB(C@L):NC(NPR) Ratio		3.22	2.07

Uncapped

Policy A Uncapped		2500 MW NPV	1600 MW NPV
NOP	NPV of Costs	$ 196.8	$ 263.2
NOP	NPV of Benefits	$ 1,233.2	$ 1,008.0
	B:C Ratio	6.27	3.83
CG	NPV of Costs	$ 8,670.5	$ 6,763.3
CG	NPV of Benefits	$ 10,966.0	$ 8,902.6
	B:C Ratio	1.26	1.32
NPR	NPV of Costs	$ 6,927.9	$ 6,256.5
NPR	NPV of Benefits	$ 5,178.0	$ 3,768.9
	B:C Ratio	0.75	0.60
C@L	NPV of Costs	$ 5,271.6	$ 4,347.5
C@L	NPV of Benefits	$ 13,486.0	$ 10,051.7
	B:C Ratio	$ 2.6	$ 2.3
NB(C@L):NC(NPR) Ratio		4.69	2.29

Policy Path B

Capped

Policy B Capped		2500 MW NPV		1600 MW NPV	
NOP	NPV of Costs	$	337.5	$	277.7
NOP	NPV of Benefits	$	1,231.0	$	1,010.3
	B:C Ratio		3.65		3.64
CG	NPV of Costs	$	9,058.4	$	7,059.2
CG	NPV of Benefits	$	11,420.4	$	9,057.2
	B:C Ratio		1.26		1.28
NPR	NPV of Costs	$	7,488.5	$	6,409.7
NPR	NPV of Benefits	$	5,282.0	$	3,833.0
	B:C Ratio		0.71		0.60
C@L	NPV of Costs	$	5,606.2	$	4,590.7
C@L	NPV of Benefits	$	13,753.8	$	10,080.9
	B:C Ratio	$	2.5	$	2.2
NB(C@L):NC(NPR) Ratio			3.69		2.13

Uncapped

Policy B Uncapped		2500 MW NPV		1600 MW NPV	
NOP	NPV of Costs	$	245.7	$	285.0
NOP	NPV of Benefits	$	1,516.6	$	1,070.8
	B:C Ratio		6.17		3.76
CG	NPV of Costs	$	9,423.8	$	6,947.4
CG	NPV of Benefits	$	11,342.9	$	9,117.4
	B:C Ratio		1.20		1.31
NPR	NPV of Costs	$	7,687.9	$	6,376.9
NPR	NPV of Benefits	$	5,218.0	$	3,780.1
	B:C Ratio		0.68		0.59
C@L	NPV of Costs	$	4,989.0	$	4,263.7
C@L	NPV of Benefits	$	13,584.5	$	10,120.1
	B:C Ratio	$	2.7	$	2.4
NB(C@L):NC(NPR) Ratio			3.48		2.26

TAKE-AWAYS & OBSERVATIONS

ON ALTERNATIVE FUTURES

Overarching Observations re: SREC Policy

- Future policies should not be judged on the sunk costs of past policies (i.e., SREC-I is much more costly than SREC-II or subsequent policies will / should be).
- In-state spending is important driver to benefits of C@L
- Avoided capacity costs are also a material factor of benefits of C@L
- T&D charges avoided by onsite generation and VNM charges are significant in all scenarios and it is understandable that the utilities are concerned about the impacts of the current incentive framework
- Virtual net metering is a very effective tool for supporting project and participant diversification
  - It allows lower cost project that can leverage economies of scale
- There is not a huge difference in costs to NPRs vs. revenue to CGs under the current SREC program, nonetheless ultimate costs to NPRs could decrease significantly with LSEs participation in the auction
- In the uncapped scenarios, the DOER's price demand response auction mechanism is at risk of being overwhelmed with growth and leaving SREC prices near the SACP for *more* than 2 years in a row

Overarching Observations re: Alternative Futures

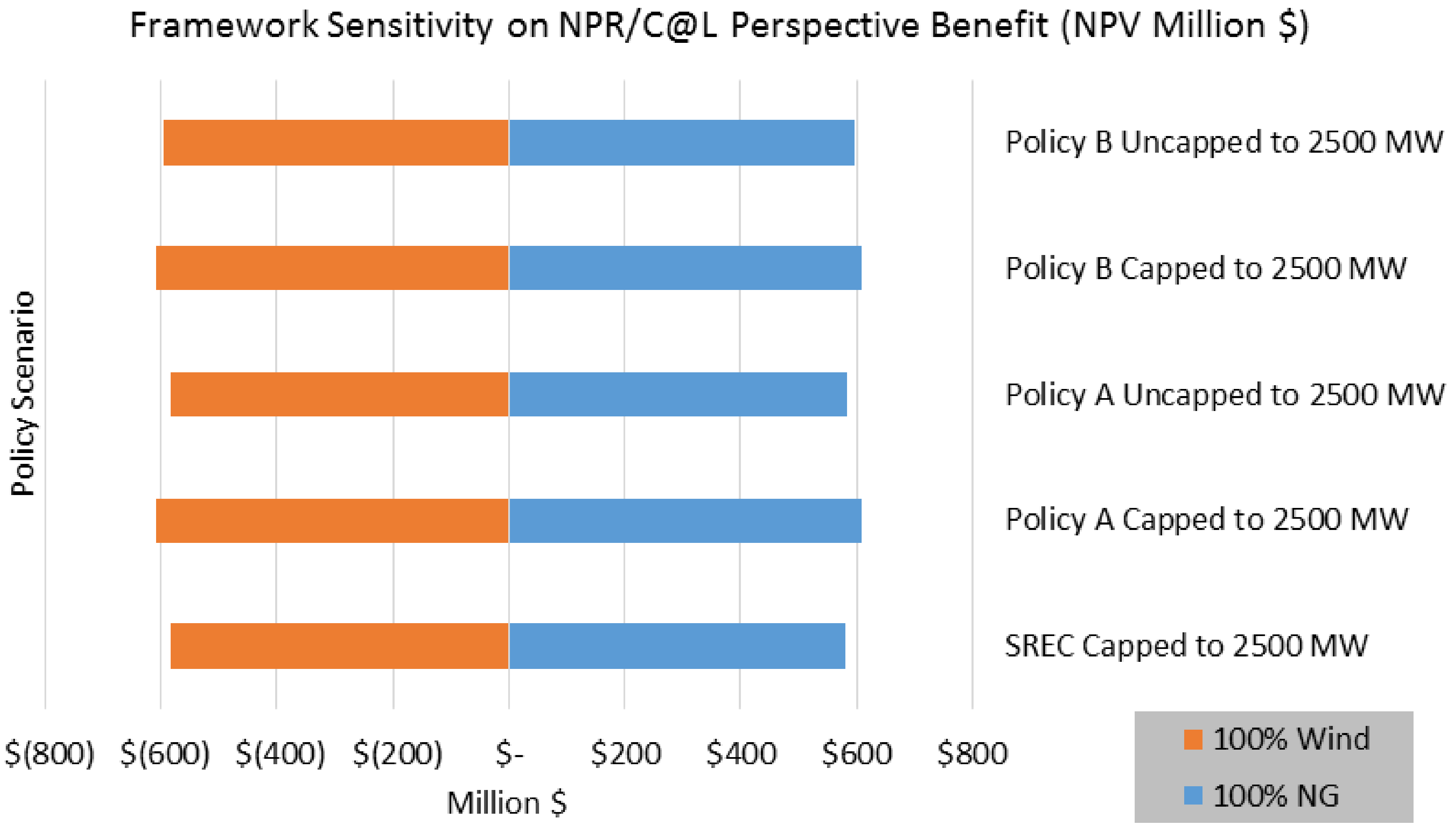
- Current combination of SREC policy and net metering framework is providing large margins for a diverse array of project types and participants
  - From analysis of Policy Paths A & B it is apparent that growth can still occur at lower margins
- Net metering caps will change the project mix dramatically to more onsite and less cost effective project mix as it will drive smaller onsite projects
- It is feasible/economical to retain the net metering *mechanism* in order to allow for projects like CSS/LIH VNM, but at a incentives less than the current net metering credit *rate* (e.g., phasing down, or at retail generation only or at QF wholesale rates), thus allowing diversity and participation from many sectors
- Paths A & B show improved B:C metrics, but several futures are similar enough that other drivers (like diversity of project types and beneficiaries) may drive preferences.
- *It is possible…*
  - *That Path B uncapped could look as attractive as Path A with lower NMC rates?*
  - *That SREC-III uncapped could look attractive with Path A's approach to setting NMC rates?*
  - *That Path A or B, NM uncapped, but a phase-down of NMC value and phase-in of minimum bill, with sectors fine-tuned to achieve a desired supply mix, is a fertile 'middle ground'?*

SENSITIVITY ANALYSES

Frameworks Sensitivity
Compared to Base of 50/50 Weighting btw. Solar PV Avoidds Wind or NG

NPR and C@L are the only perspectives impacted.

Impacts are volume-sensitive, not policy-sensitive.



Variables Available for Parametric Sensitivity Analysis
e.g. a 10% change* is readily scalable for ease of application

		Parameter	Selected Parameter	Selected Value	Base	Sensitivity	Description
System Installed Costs	CB1.1	A	Base	42%	42%	52.0%*	% of System Installed Cost Expenditures Retained In-State
Ongoing O&M + Insurance Costs	CB1.2	A	Base	64%	64%	74.0%*	% of Ongoing O&M & Insurance Cost Expenditures Retained In-State
ROI (Aggregate Return to Debt & Equity)	CB1.5	A	Base	30%	30%	40.0%*	% of Return to Debt & Equity Investors Retained In-State
Federal Incentives (ITC)	CB1.7a	A	Base	15%	15%	25.0%*	% of Federal ITC retained in-state (assume same as CB1.1-A)
Avoided Generation Capacity Costs	CB5.3	A	Base	28.8%	28.8%	38.8%*	Fraction of solar PV monetizing its value in the FCM; [56 MW of DR PV with CSOs + 85 MW of PV with included on the load side for the FCA9 ICR calculation] divided by 489 MW total forecast = 28.8%
Avoided Trans. Investment - Remote Wind	CB6.1	A	Base	$ 27.50	$ 27.50	$ 35.00	$/MWh Incremental TX cost for Northern New England wind avoided by supplanting need for Class I wind with MA Solar PV
Avoided Trans. Investment - Remote Wind	CB6.1	B	Base	55%	55%	80%	% of incremental TX cost for Northern New England Wind assumed allocated to load
Avoided Transmission Investment - Local	CB6.2	A	Base	30%	30.0%	40%*	% of load on feeders with growth
Avoided Transmission Investment - Local	CB6.2	B	Base	80%	80.0%	90%*	Scalar Adjustment Factor for technical issues (reduces gross value to account for a variety of technical issues preventing solar PV from avoiding investment deferral
Avoided Distribution Investment	CB6.3	A	Base	30%	30.0%	40%*	% of load on feeders with growth
Avoided Distribution Investment	CB6.3	B	Base	50%	50.0%	60%*	Scalar Adjustment Factor for technical issues (reduces gross value to account for a variety of technical issues preventing solar PV from avoiding investment deferral
Avoided Distribution Investment	CB6.3	C	Base	50%	50.0%	60%*	Scalar derating factor applied to distribution level energy losses avoided by solar PV, to reflect that the D investment is at varying locations often close to load, while aggregate D losses measured at D system injection; also reflects that some of literature review sources were already loss adjusted

Parametric Sensitivities (Policy Path A Uncapped to 2500 MW)

		Parameter	Selected Parameter	Selected Value	Base	Sensitivity	NOP		CG		NPR		C@L	
							C	B	C	B	C	B	C	B
System Installed Costs	CB1.1	A	Sensitivity	52.0%	42%	52.0%	$ -	$ -	$ -	$ -	$ -	($1.86)	$ -	$621.82
Ongoing O&M + Insurance Costs	CB1.2	A	Sensitivity	74.0%	64%	74.0%	$ -	$ -	$ -	$ -	$ -	($1.86)	$ -	$86.07
ROI (Aggregate Return to Debt & Equity)	CB1.5	A	Sensitivity	40.0%	30%	40.0%	$ -	$ -	$ -	$ -	$ -	($1.86)	$ -	$227.69
Federal Incentives (ITC)	CB1.7a	A	Sensitivity	25.0%	15%	25.0%	$ -	$ -	$ -	$ -	$ -	($1.86)	$ -	$131.85
Avoided Generation Capacity Costs	CB5.3	A	Sensitivity	38.8%	28.8%	38.8%	$ -	$ -	$ -	$41.33	$ -	($43.18)	$ -	$10.54
Avoided Trans. Investment - Remote Wind	CB6.1	A	Sensitivity	$ 35.00	$ 27.50	$ 35.00	$ -	$ -	$ -	$ -	$ -	$47.65	$ -	$47.65
Avoided Trans. Investment - Remote Wind	CB6.1	B	Sensitivity	80%	55%	80%	$ -	$ -	$ -	$ -	$ -	$80.66	$ -	$80.66
Avoided Transmission Investment - Local	CB6.2	A	Sensitivity	40.0%	30.0%	40.0%	$ -	$ -	$ -	$ -	$ -	$9.50	$ -	$9.50
Avoided Transmission Investment - Local	CB6.2	B	Sensitivity	90.0%	80.0%	90.0%	$ -	$ -	$ -	$ -	$ -	$2.40	$ -	$2.40
Avoided Distribution Investment	CB6.3	A	Sensitivity	40.0%	30.0%	40.0%	$ -	$ -	$ -	$ -	$ -	$20.14	$ -	$20.14
Avoided Distribution Investment	CB6.3	B	Sensitivity	60.0%	50.0%	60.0%	$ -	$ -	$ -	$ -	$ -	$14.70	$ -	$14.70
Avoided Distribution Investment	CB6.3	C	Sensitivity	60.0%	50.0%	60.0%	$ -	$ -	$ -	$ -	$ -	($1.62)	$ -	($1.62)

One Scenario chosen to illustrate magnitude and relative importance of parametric assumptions.

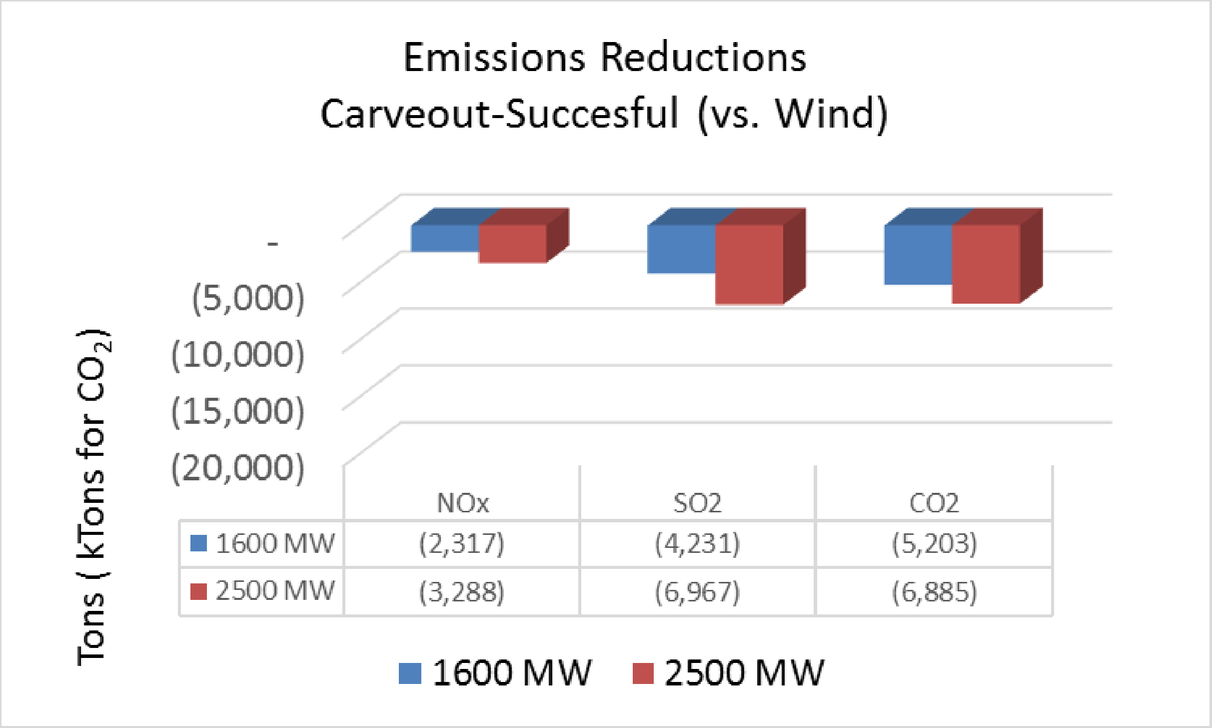
APPENDIX MATERIAL

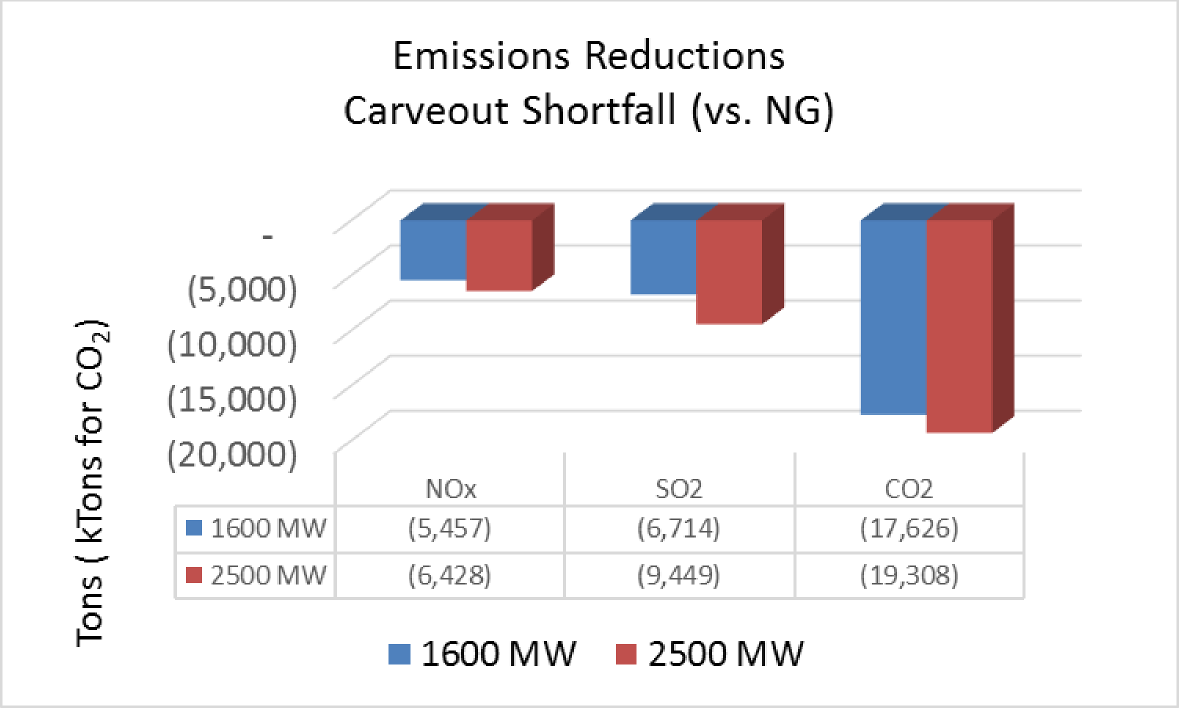
FOR POSSIBLE REFERENCE DURING PRESENTATION

APPENDIX A-I

WHOLESALE MARKET RESULTS DEPENDENT ON QUANTITIES

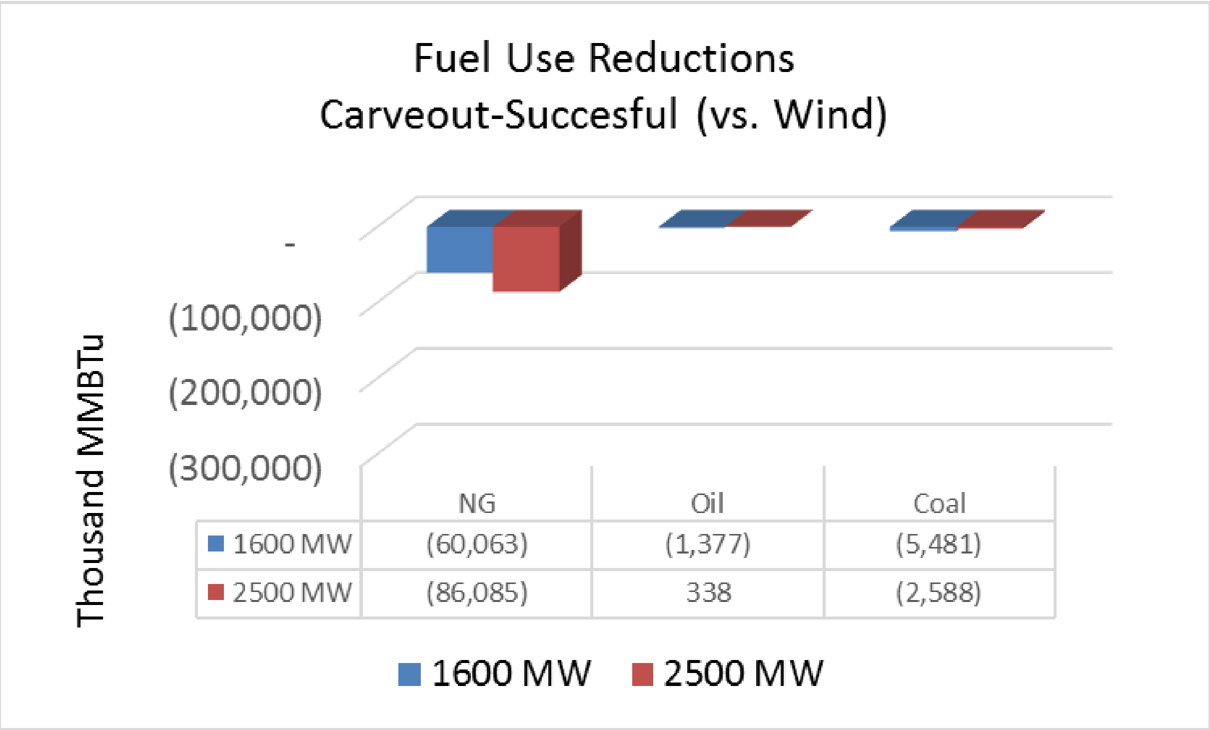
Total Emissions Reductions

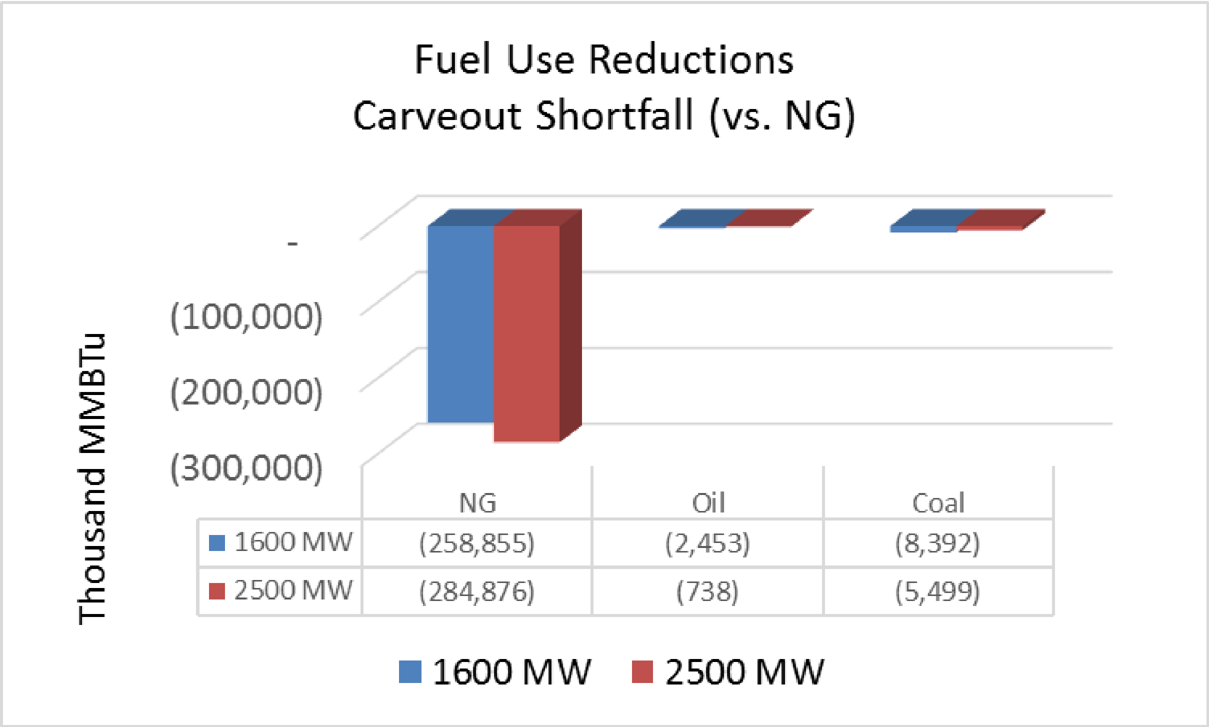




After 2018, graph on left assumes MA solar displaces RPS Class I compliance met be wind in absence of solar carve-out, while graph on right assumes inability to develop enough wind to meet RPS, with MA solar displacing natural gas.

Total Fuel Usage Reductions

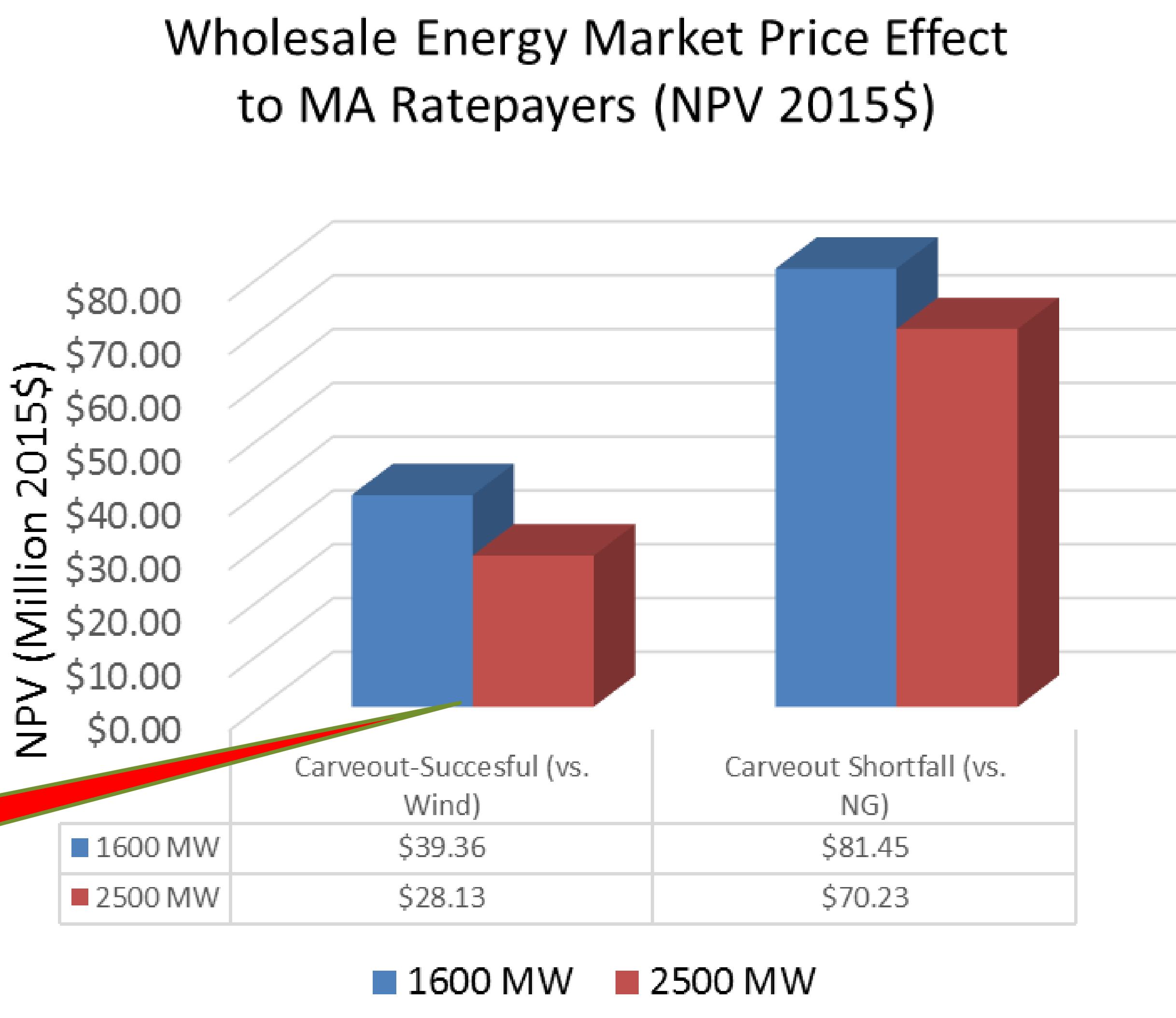




After 2018, graph on left assumes MA solar displaces RPS Class I compliance met be wind in absence of solar carve-out, while graph on right assumes inability to develop enough wind to meet RPS, with MA solar displacing natural gas.

Energy Market Price Effects

After 2018, graph on left assumes MA solar displaces RPS Class I compliance met be wind in absence of solar carve-out, while graph on right assumes inability to develop enough wind to meet RPS, with MA solar displacing natural gas.

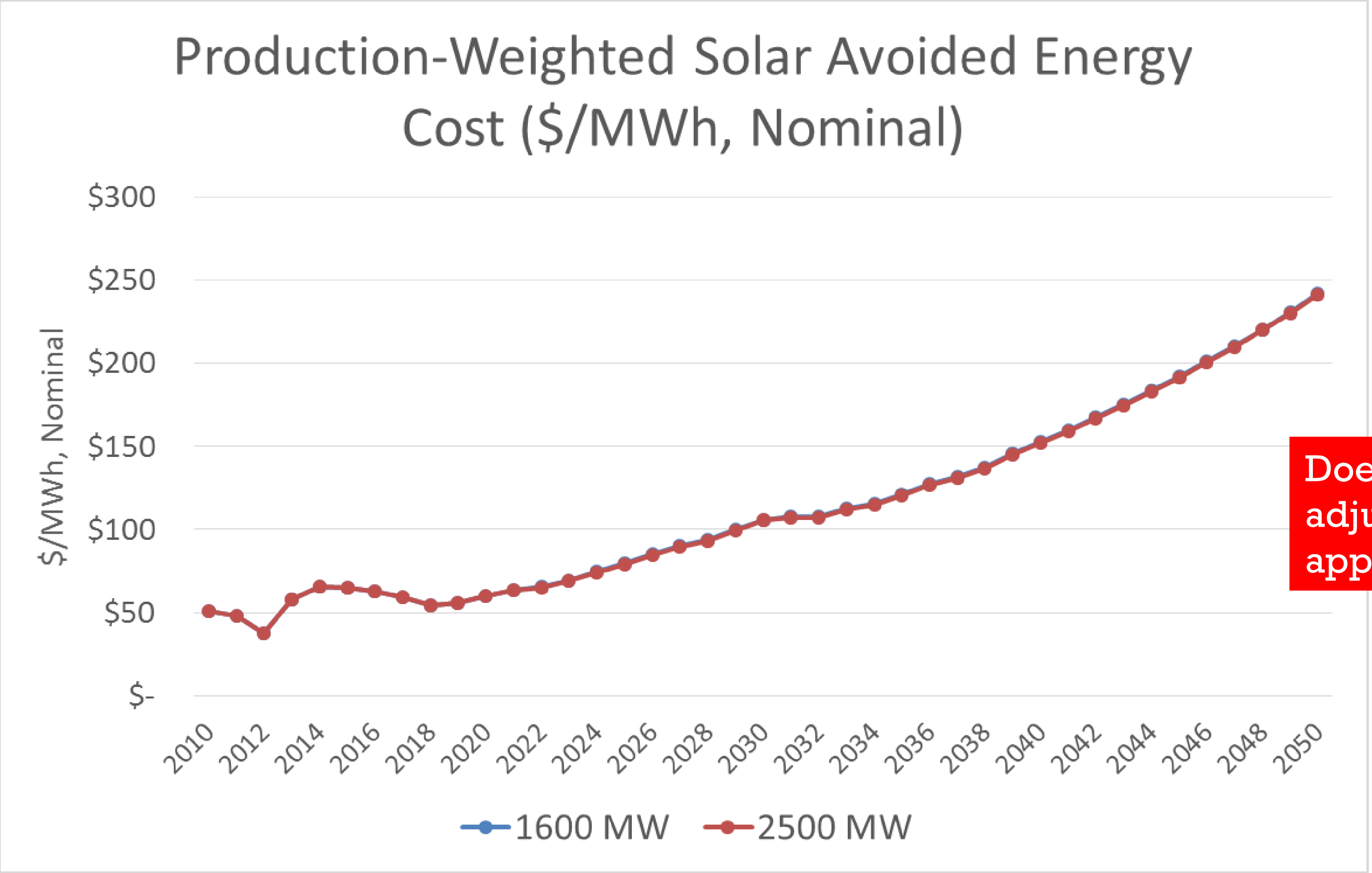


	Carveout-Succesful (vs. Wind)	Carveout Shortfall (vs. NG)
1600 MW	$39.36	$81.45
2500 MW	$28.13	$70.23

Accounts for dissipation of price effect and applies to portion not hedged, per AESC 2013 values.

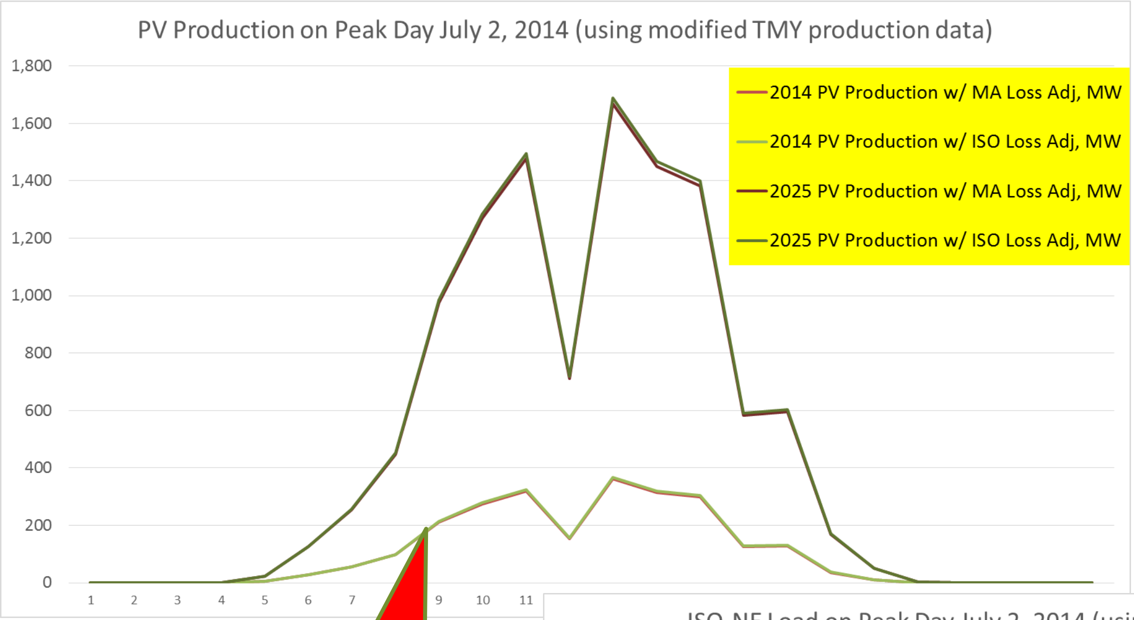
In many years, swings positive or negative

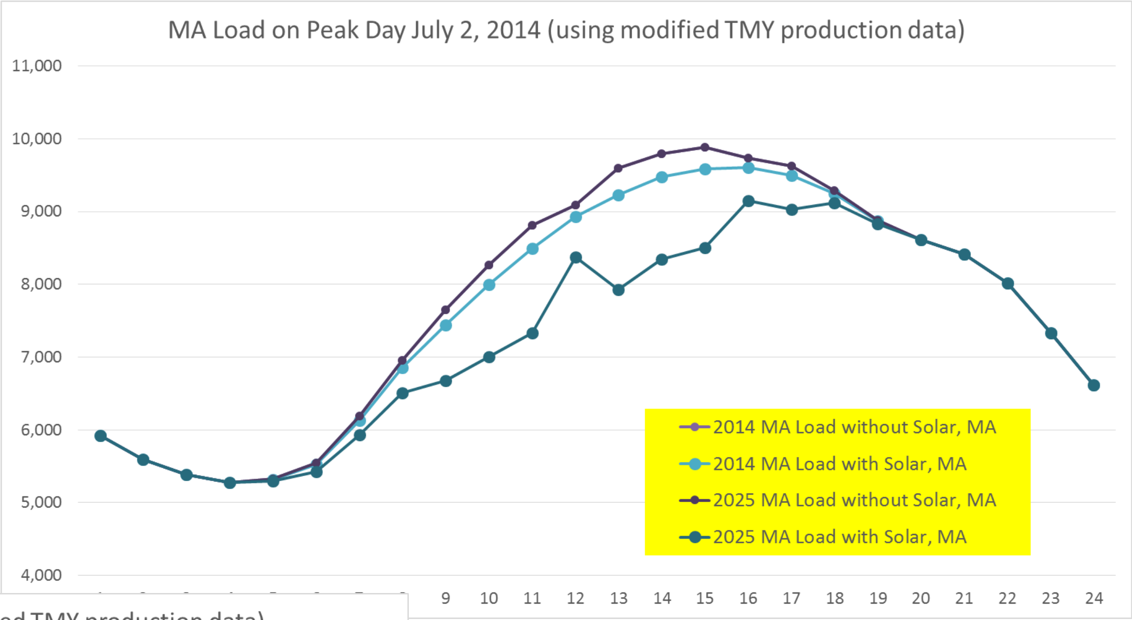
Production-Weighted Solar Avoided Energy Cost
(or, *Wholesale* Value of Solar Production) ($/MWh, Nominal)

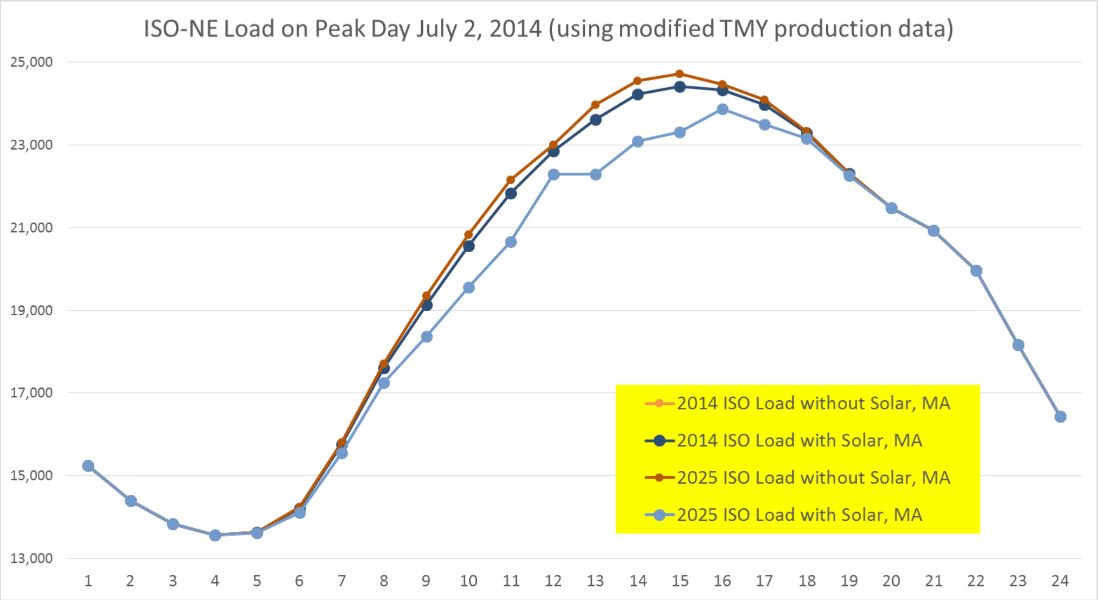


Does not reflect loss adjustment appropriate for DG

Solar Peak Impact

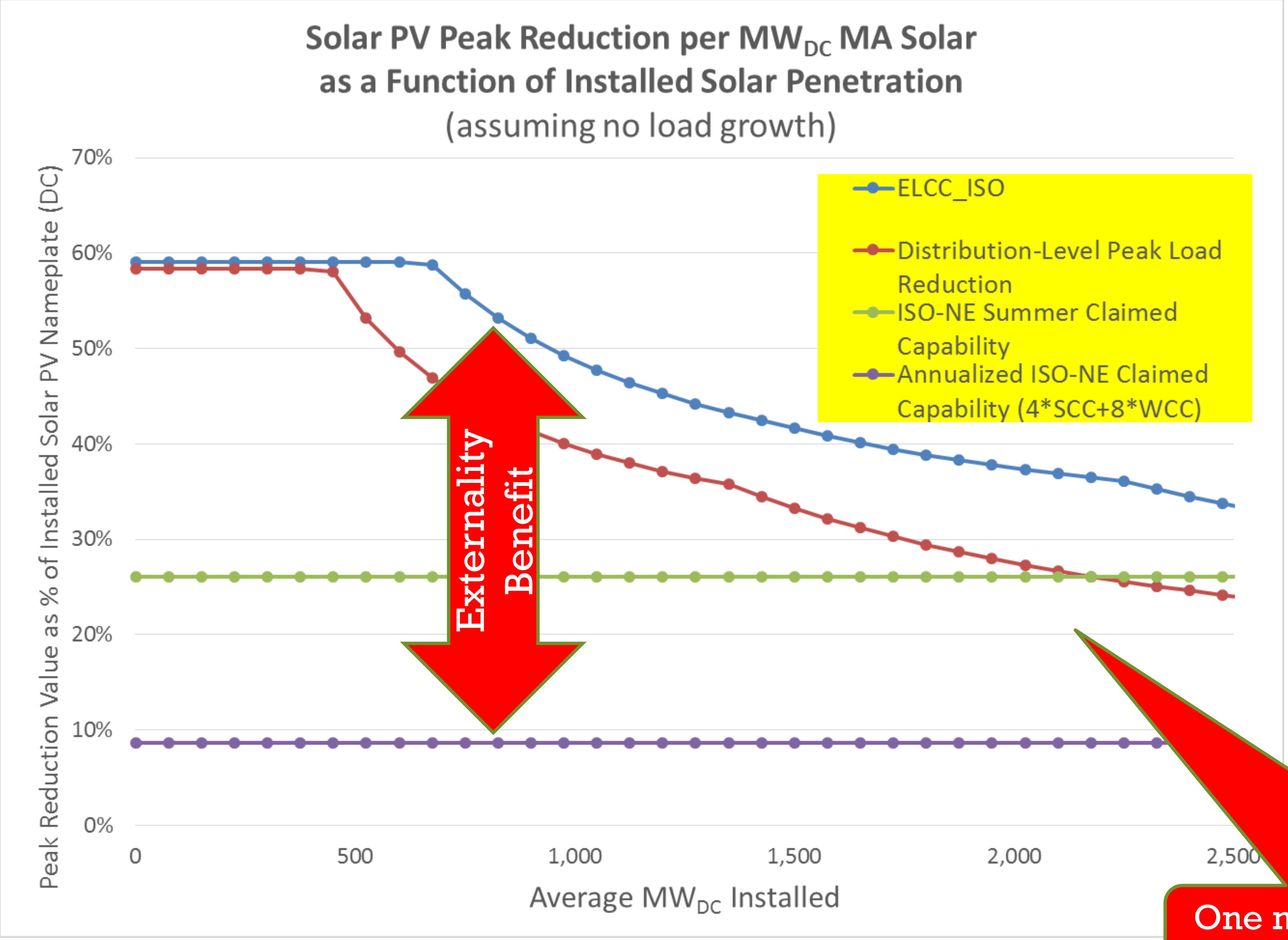






Single site proxy (note the passing cloud)… in reality, many sites smooth the aggregate curve

Solar PV Impact on Avoiding G, T & D Capacity



- ISO-NE FCM value (purple):
  - Doesn't vary with PV MW
  - Well below impact on reducing peaks until PV penetrations >> 2500 MW
- Actual PV impact on peaks declines with penetration
  - PV has high peak coincidence
  - But starting to shift time of peak
  - Eventually: the CA 'Duck Diagram'
- G&T peak reduction value (blue) somewhat higher than Distribution value due to different timing of peaks
- Difference between *actual* impact (e.g. lower ISO ICR) and value in FCM market is a *benefit* to all citizens of MA
- FCM value not monetized by generators also a *benefit* to all citizens of MA

One more calculation to come: RNS Tariff value (12CP → monthly peak impacts)

APPENDIX A-2

MISC. SLIDES FOR REFERENCE

MA DG Solar Avoids Electric Losses

Raw Data (Utility-specific average & peak loss factors)

	weight	Average T&D	Peak T&D	Avg. excl. TX losses	Peak excl. TX losses
Wtd. Avg MA		5.15%	8.62%	4.35%	7.34%
	weight				
NSTAR	45.28%	4.70%	6.60%	3.77%	5.300%
WMECO	7.79%	5.00%	9.78%	4.45%	8.70%
NGRID - MECO	45.69%	5.60%	10.38%	4.90%	9.077%
NGRID - NEC	0.31%	5.60%	10.38%	4.90%	9.08%
FG&E	0.92%	5.60%	10.38%	4.90%	9.08%

Blue: provided by EDCs
Black: imputed based on similar relationships of peak to average data in blue
Red: used other EDC data as proxies

For Solar Impact ➔ Statewide Factors

Loss Level	Loss Factor
MA Avg. Peak T&D	8.62%
MA Avg. Peak D	7.34%
MA Avg. Production-Wtd Energy T&D	5.58%
MA Avg. Production-Wtd Energy D	4.72%

Production weighting reflects higher-than-average loss reduction due to peak coincidence
(developed using inferred square-function matching average and peak losses)

Avoided Trans. Investment - Remote Wind

- Installations of PV in MA, because of carve-out, can displace cost that would otherwise be incurred to build additional transmission to access wind out-of-state (e.g., in ME)
- Proportion of that cost borne by wind generators captured in Class I REC prices, but remainder allocated to network customers is avoided due to solar policy ➔ Benefit to **NPR** and MA **C@L** perspectives
- Annually, total cost avoided per MWh of Solar ($/MWh) =

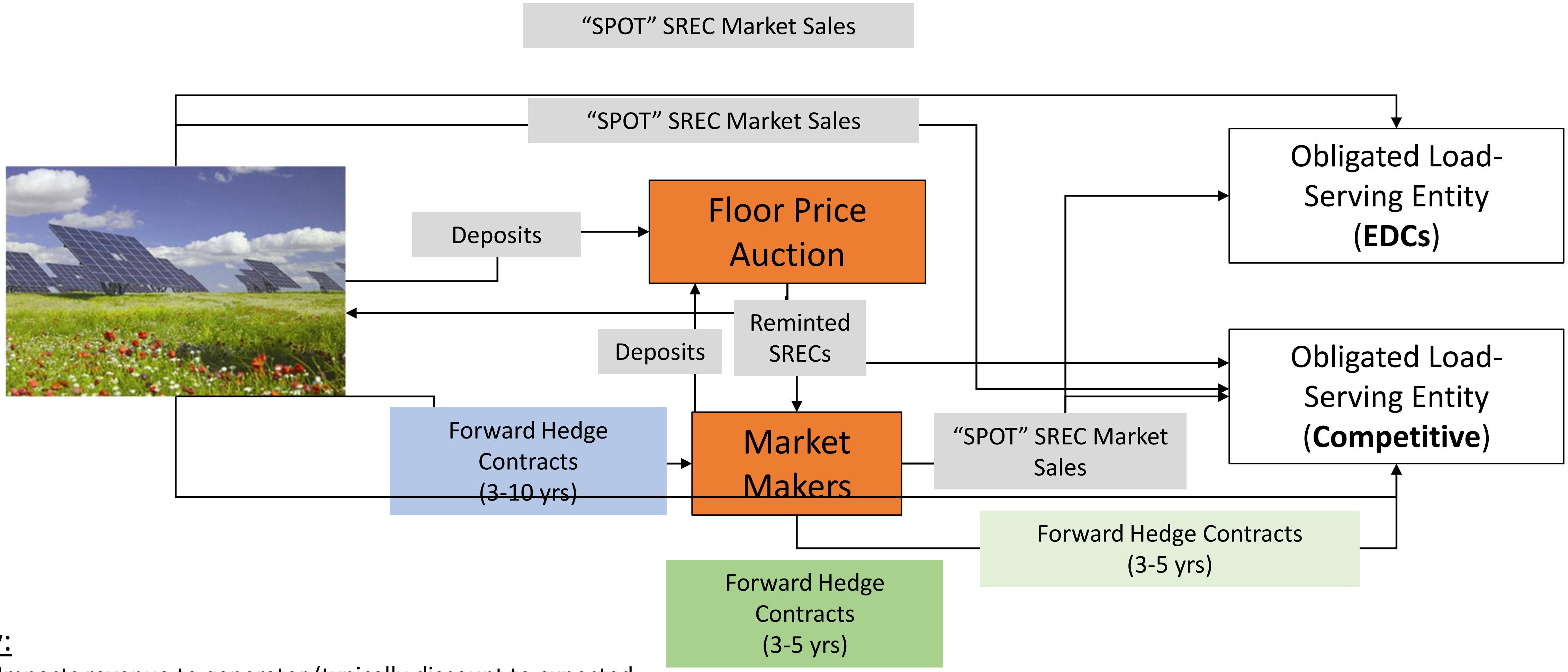
  [$A/MWh TX cost avoided] *

  [B% of wind-related TX cost allocated to load] *

  [C MA Load Ratio Share for RNS Tariff].
- *Initial Estimate*: A: $27.50/MWh; B: 55%; C: 43.6%
  - *(equivalent impact to: A ~ $18/MWH with B ~ $85%)*
- (Assumes no TX avoided until 2021)

- NPV (2015$) results:
- **$116.5 million** (1600 MW)
- **$183.6 million** (2500 MW)

The Hidden Economy of MA SREC Market



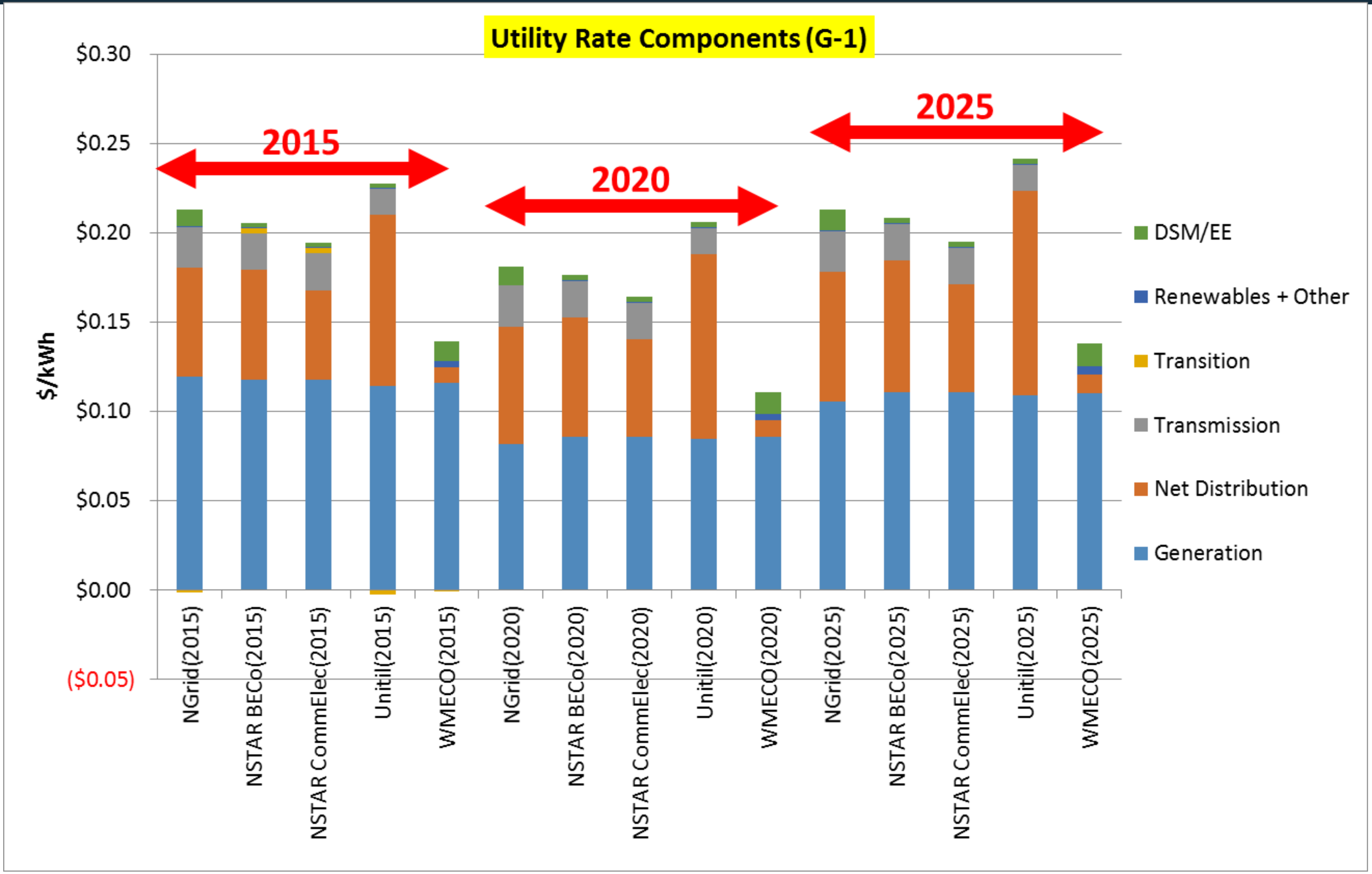
Key:

- Impacts revenue to generator (typically discount to expected 'spot' and often discount to Auction floor)
- Impacts cost to LSEs/ratepayers (typically discount to expected 'spot' and often discount to Auction floor)
- Est. impacts reflected in Costs and Benefits analysis

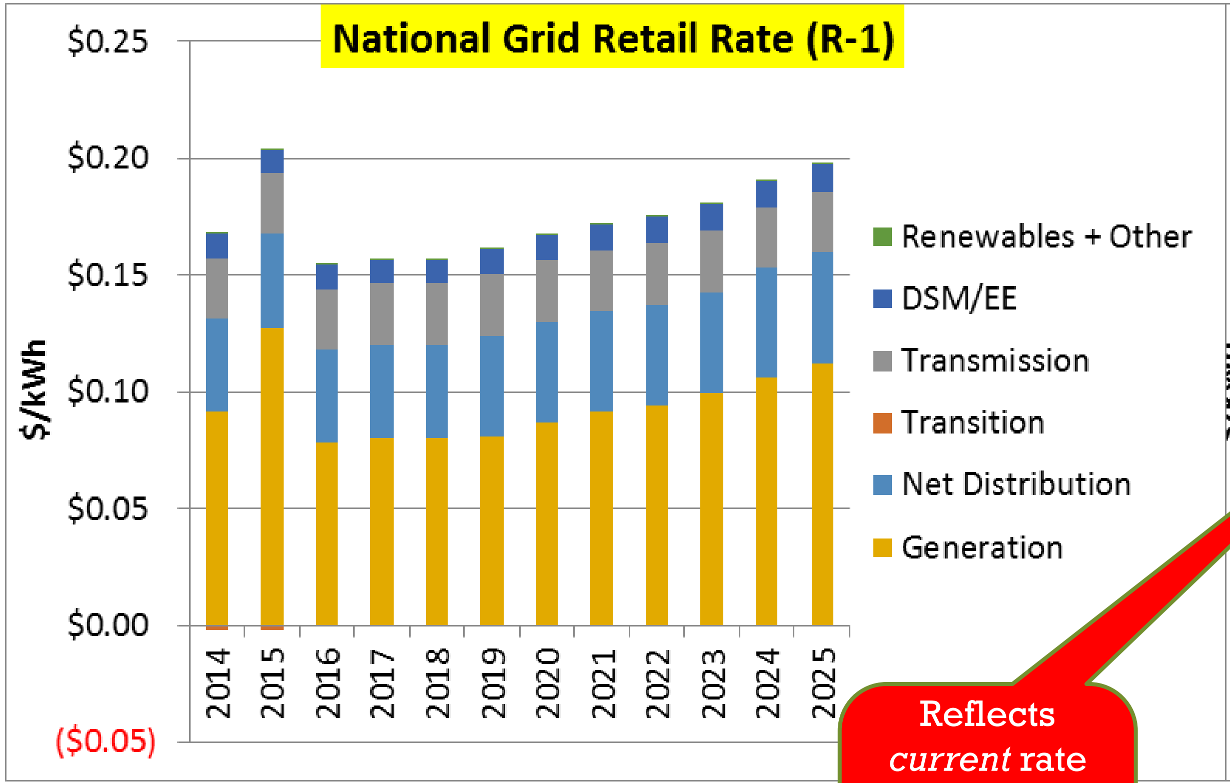
APPENDIX A-3

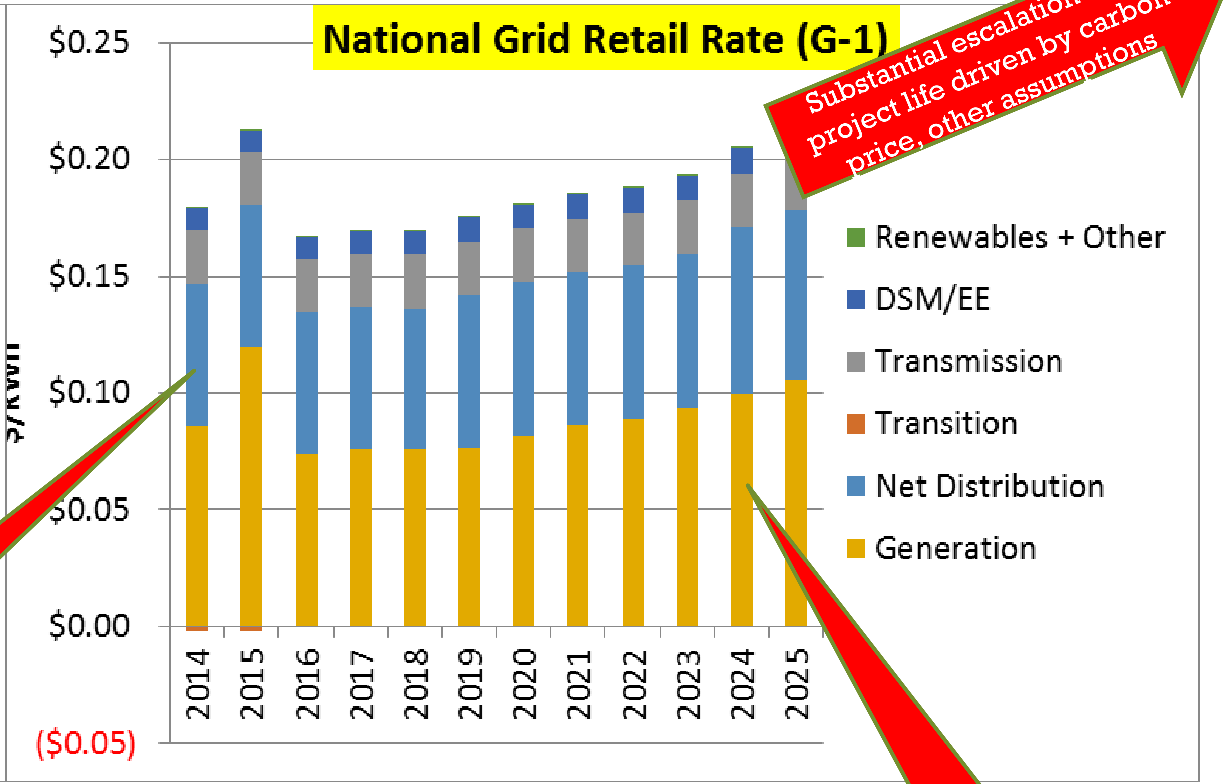
PROJECTED RETAIL RATE COMPONENTS

Projected Retail Rate Components:
By EDC



Projected Retail Rate Components:
National Grid, Illustrative trajectory over time





Substantial escalation over project life driven by carbon price, other assumptions

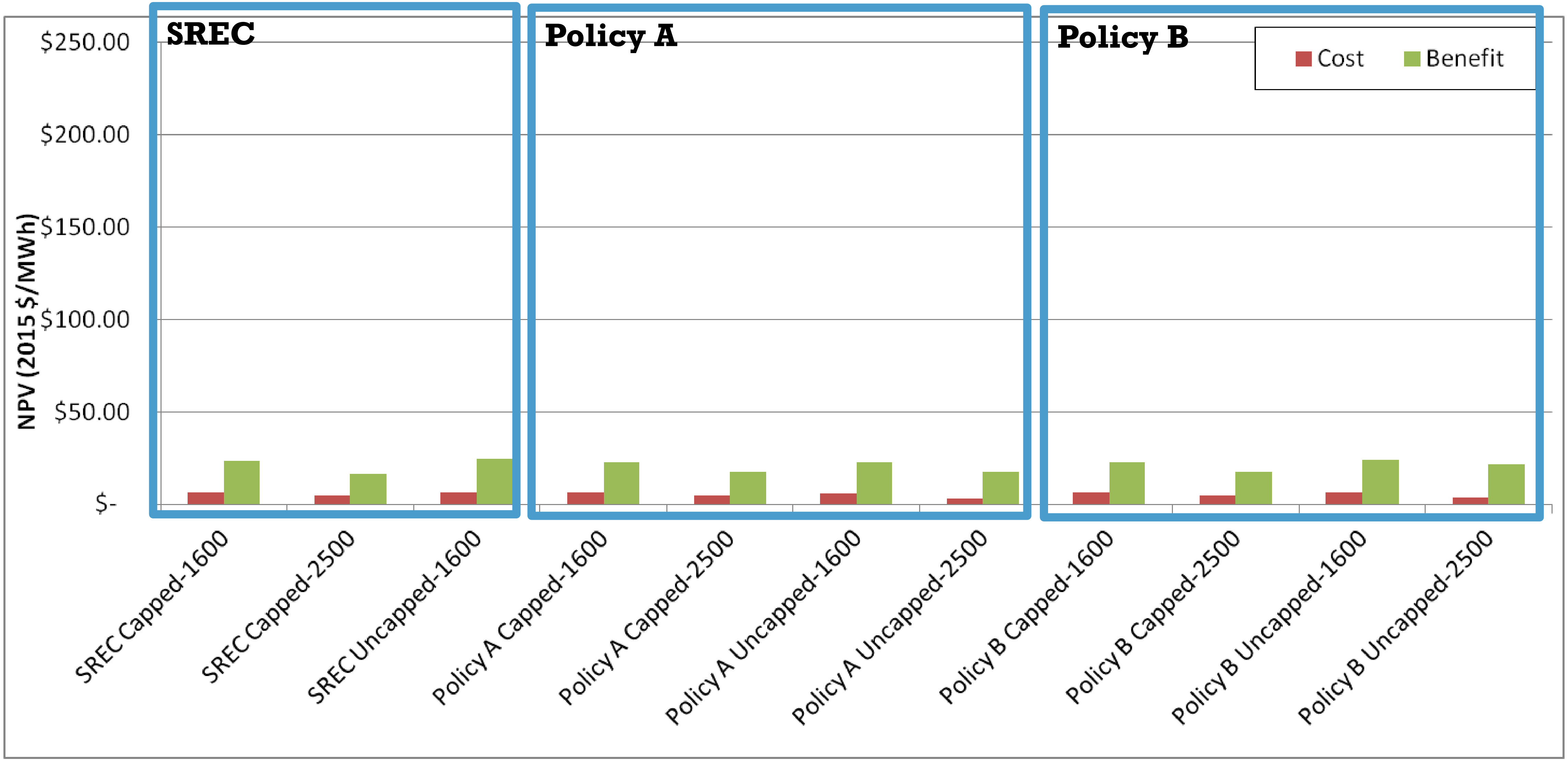
Reflects *current* rate design (most of rev. rqmt. in energy components)

Includes CT IRP FCM forecast, Synapse Low Carbon forecast, etc.

APPENDIX A-4

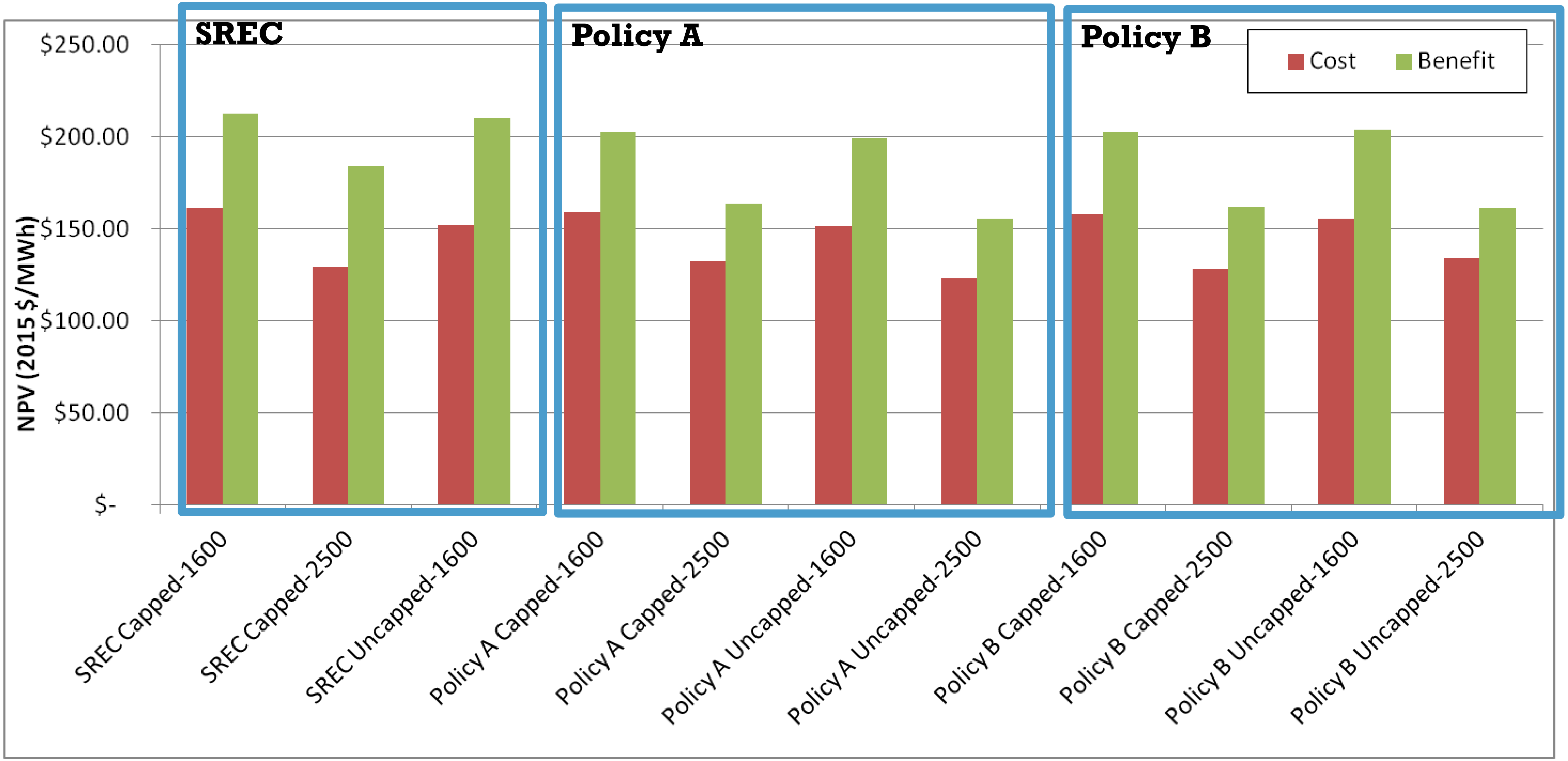
TOTAL COSTS & BENEFITS, BY PERSPECTIVE, NPV $/MWH

Total Costs & Benefits, NOP Perspective
NVP $/MWh



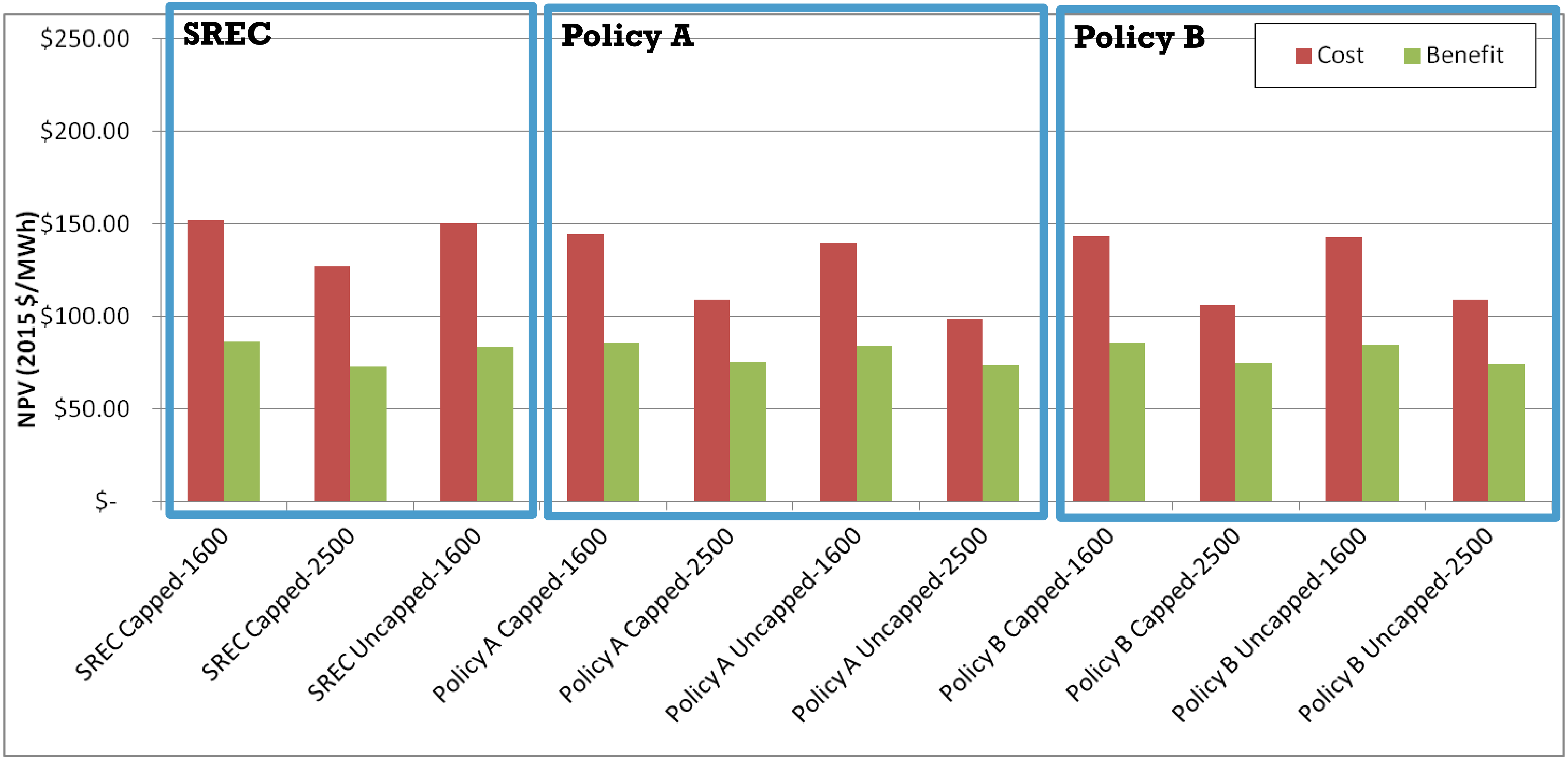
Total Costs & Benefits, CG Perspective

NPV $/MWh



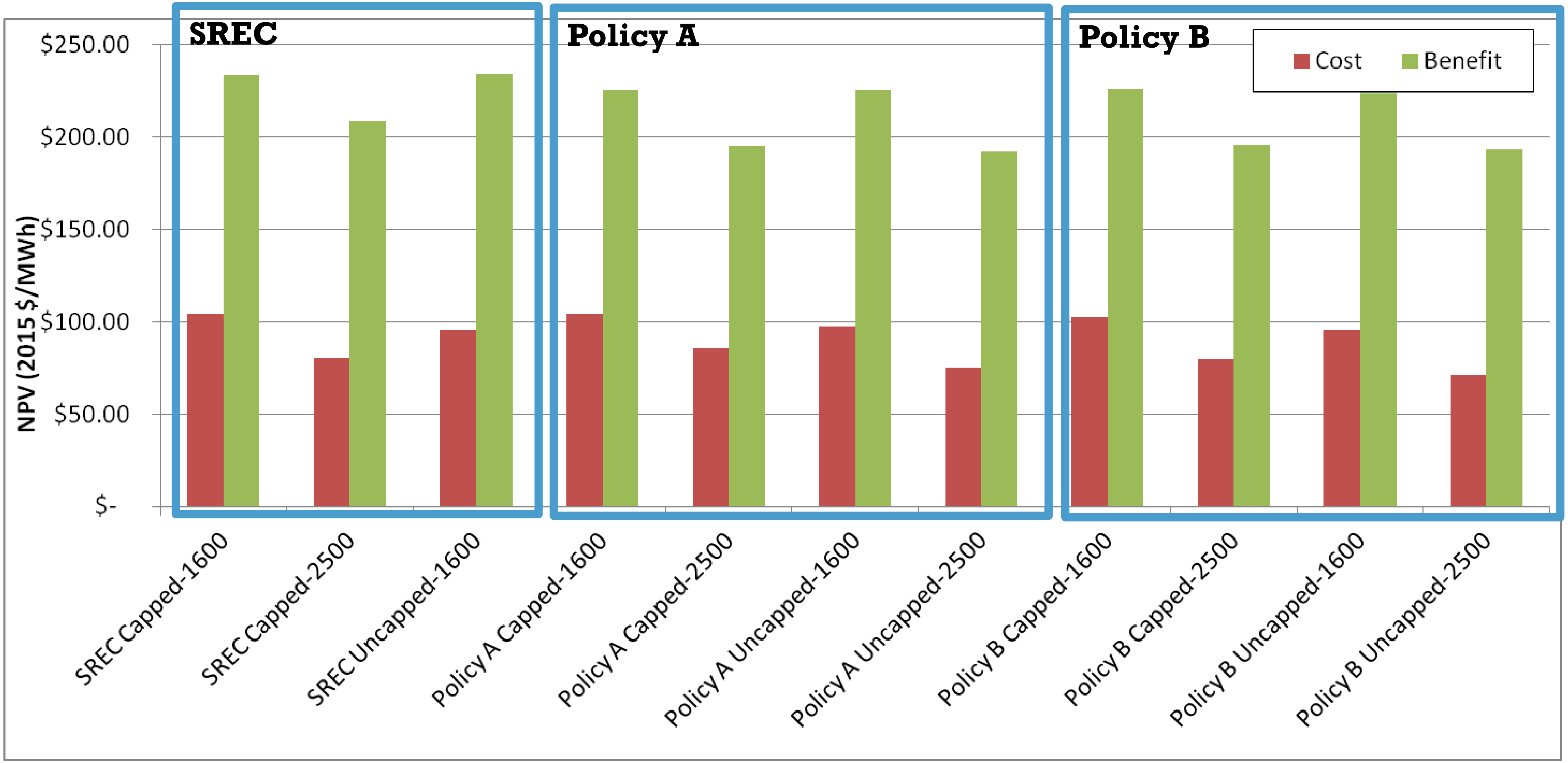
Total Costs & Benefits, NPR Perspective

NPV $/MWh



Total Costs & Benefits, C@L Perspective

NPV $/MWh

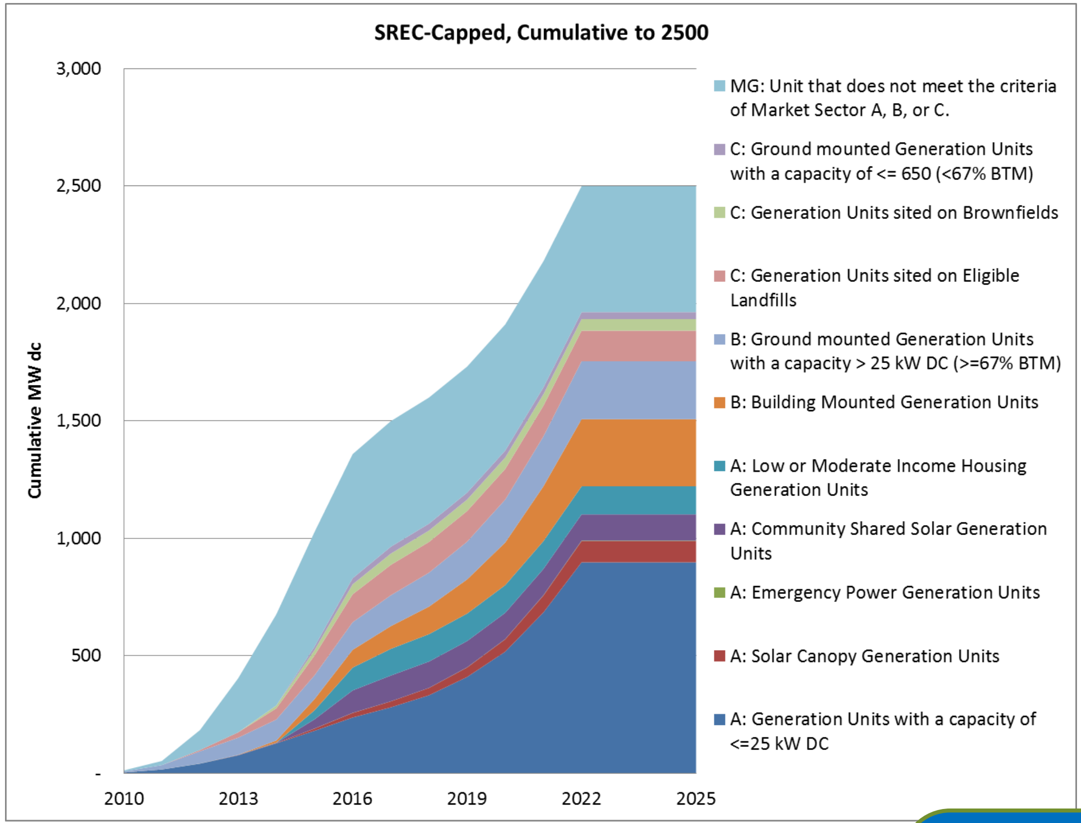


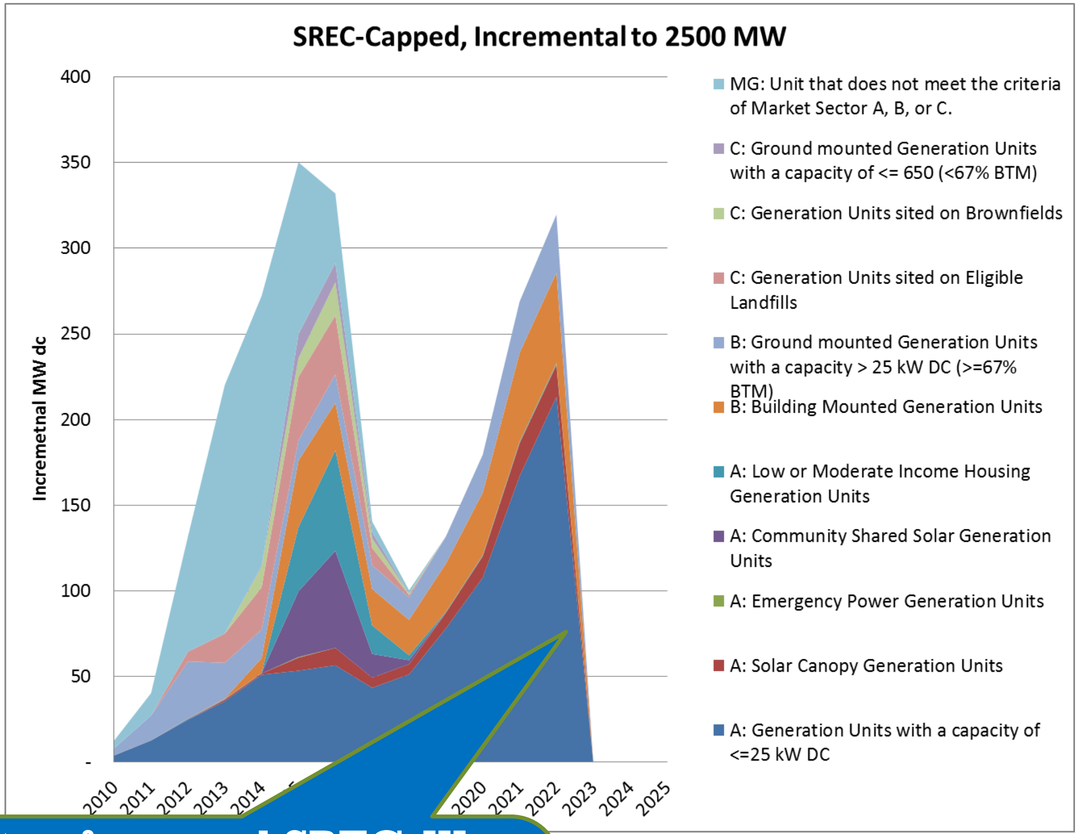
APPENDIX A-5

EXTRA BUILD-OUT QUANTITY SLIDES

Build-out By Type (SREC-II Subsectors)

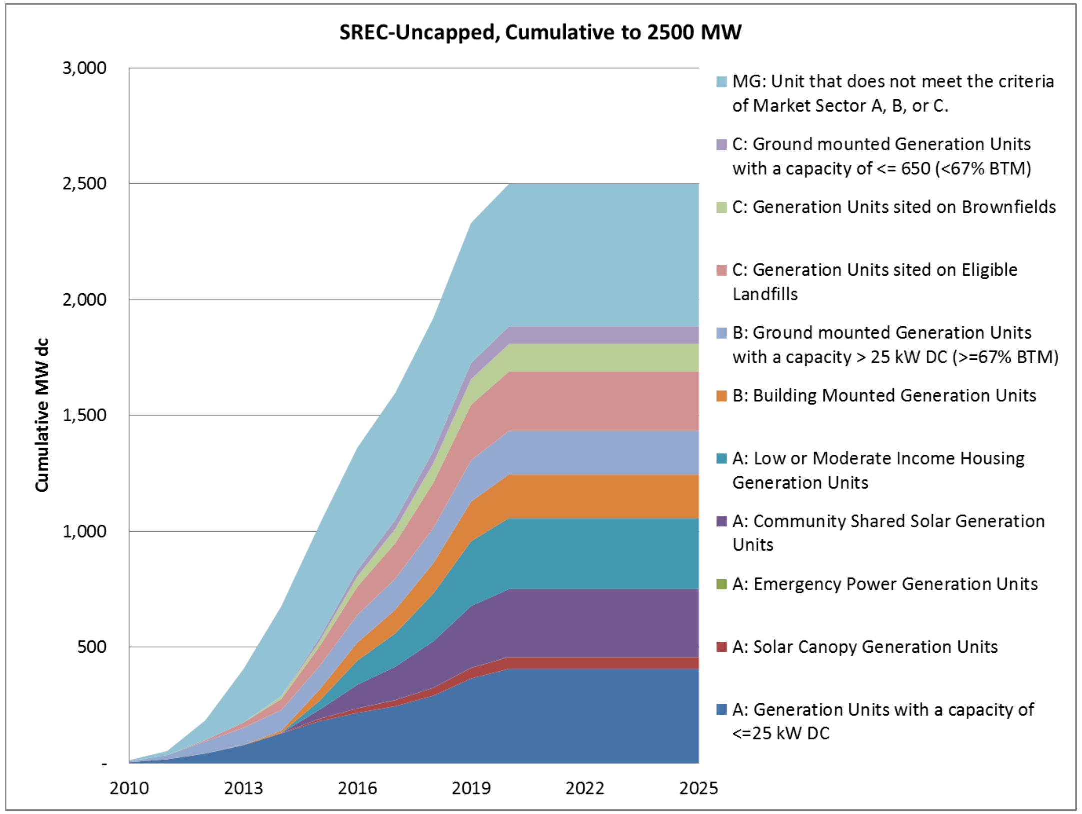
SREC, Capped, to 2500 MW

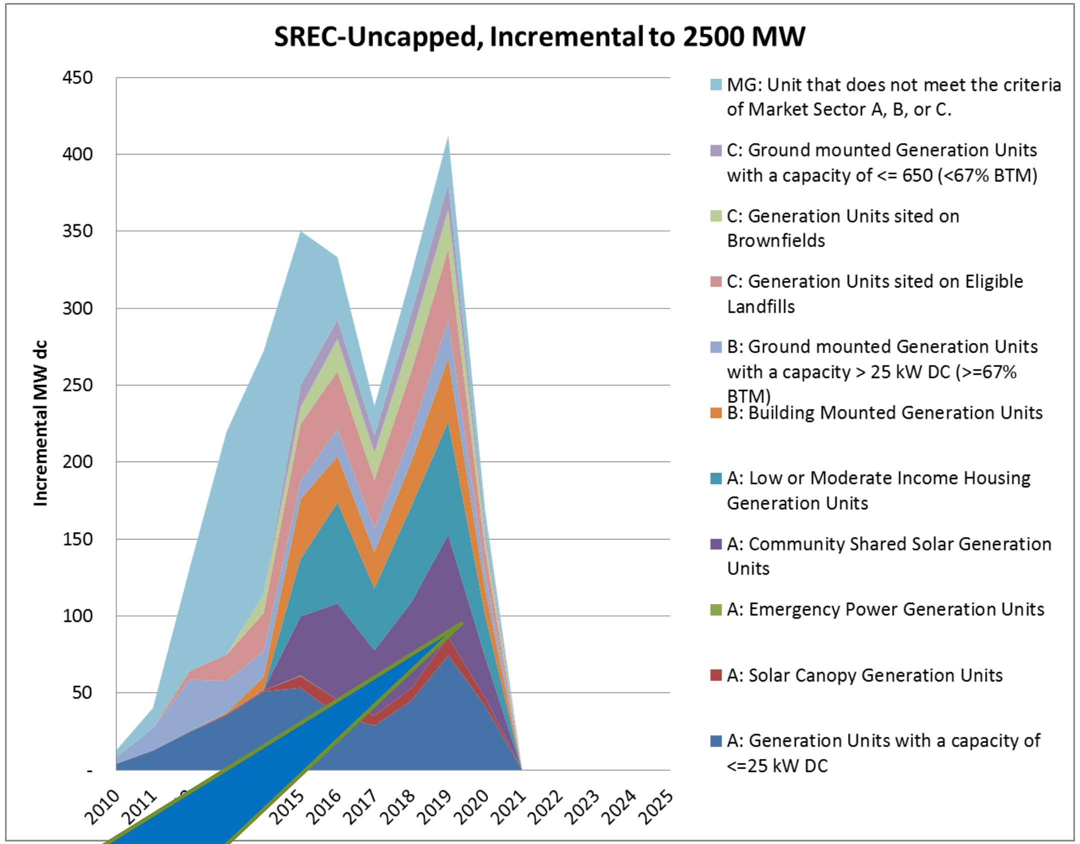




Ability of capped SREC-III program to hit targets contingent on growth of Res. Sector; can this sector have 4x growth for 2022 v. 2015?

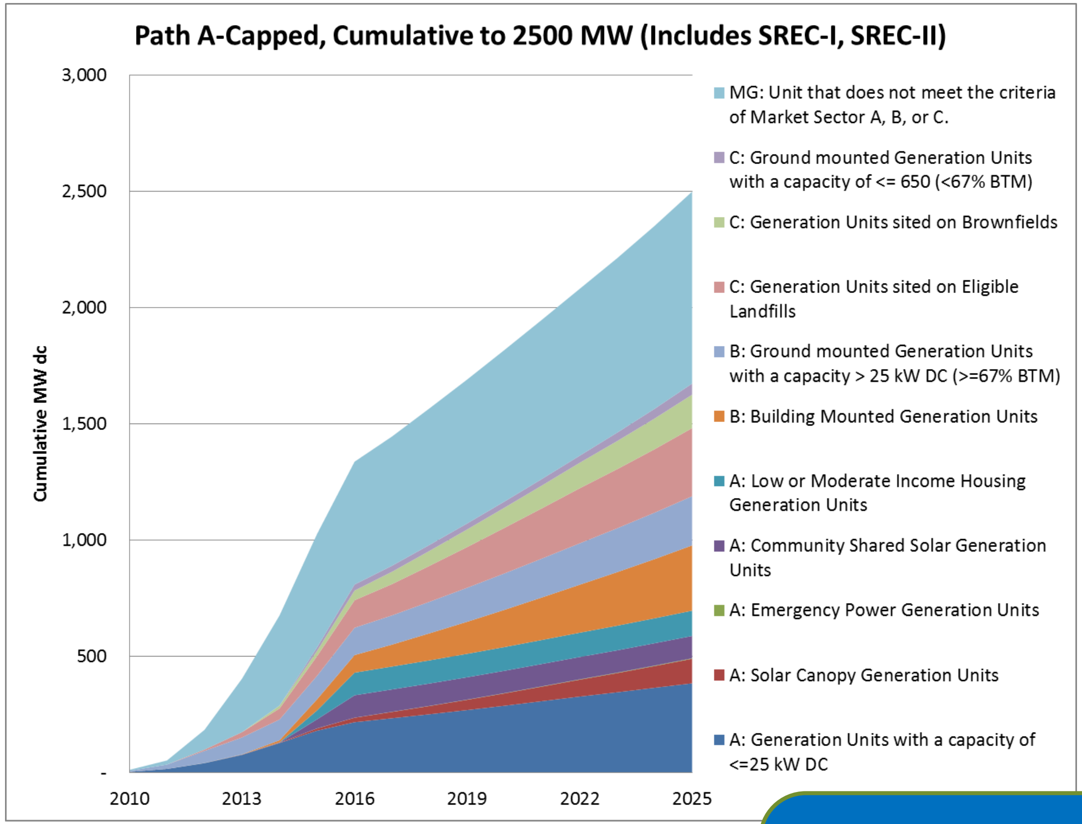
Build-out By Type (SREC-II Subsectors)
SREC, Uncapped, to 2500 MW

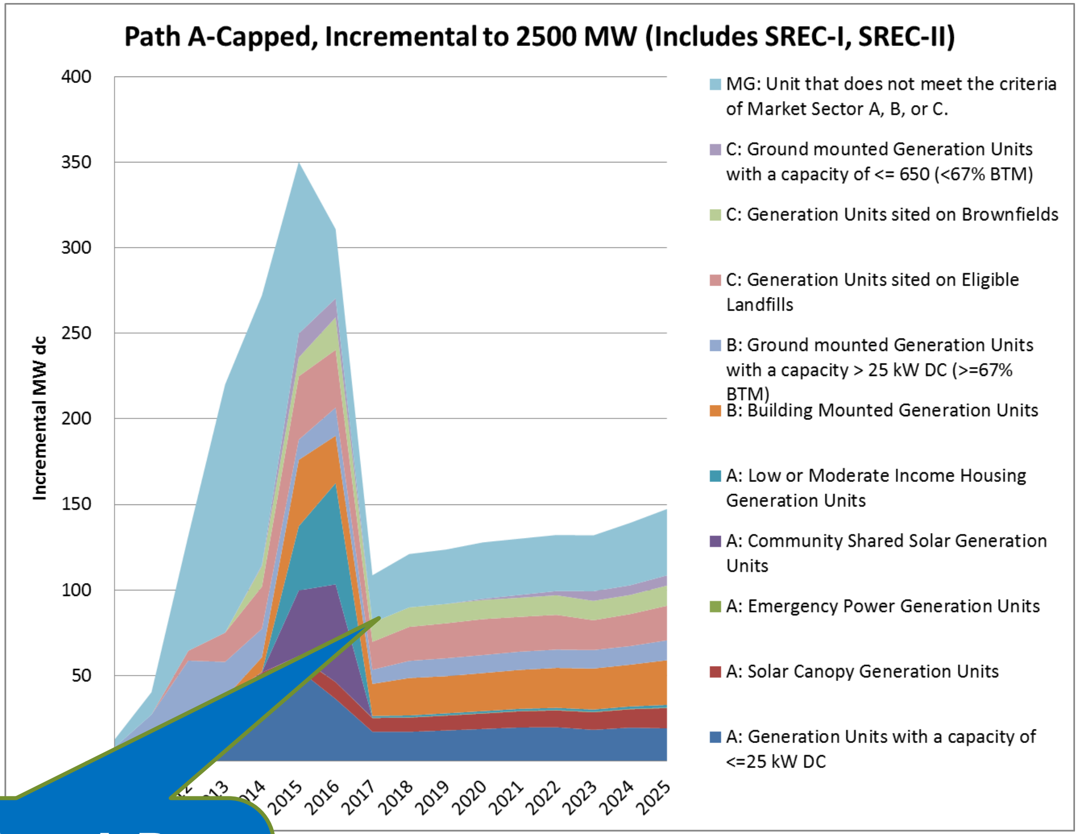




CSS and VNM LIH Dominate SREC-III Uncapped

Build-out By Type (SREC-II Subsectors)
Path A, Capped, to 2500 MW

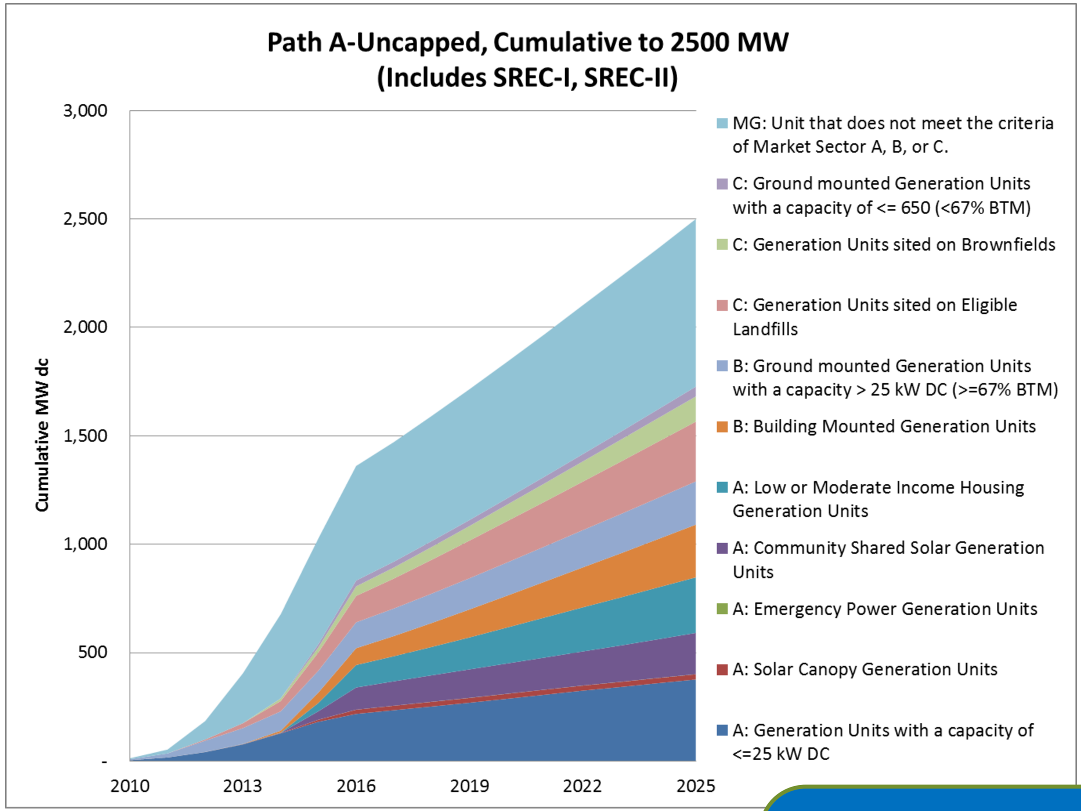


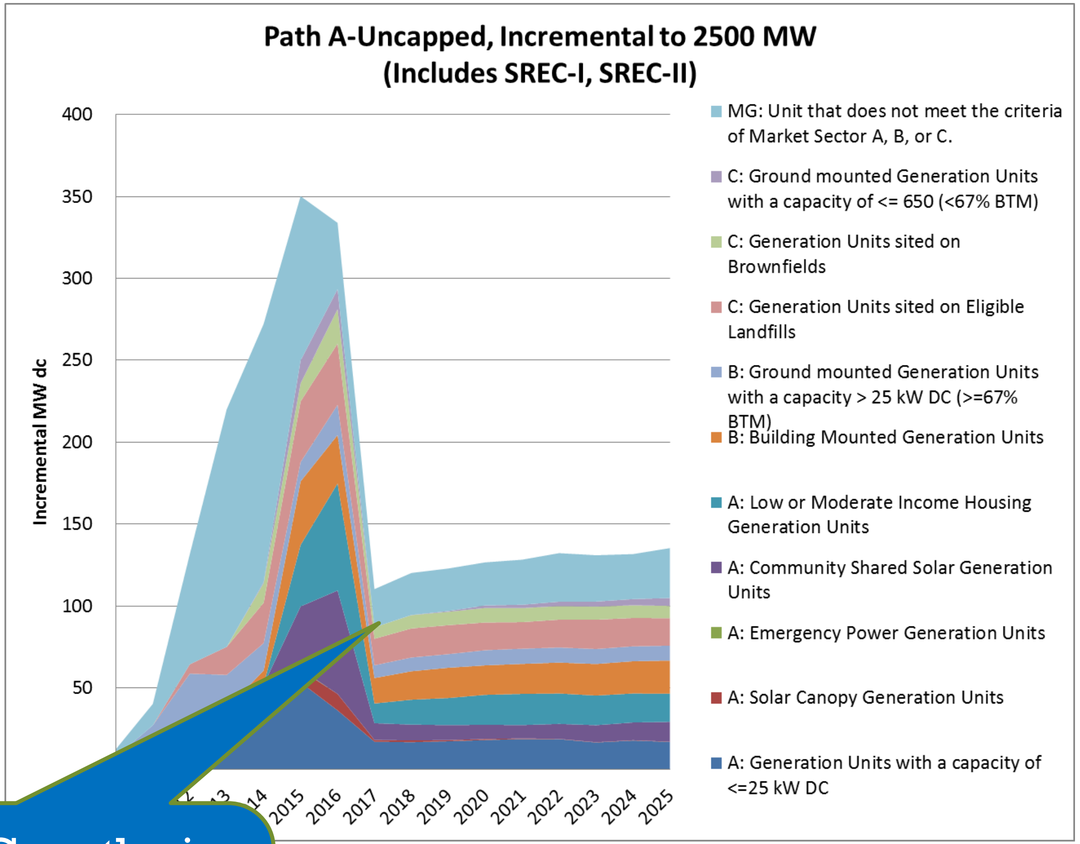


Engineered Growth Rate via quotas in Bid System, optimized curve of DBI, Small Sector.

Build-out By Type (SREC-II Subsectors)

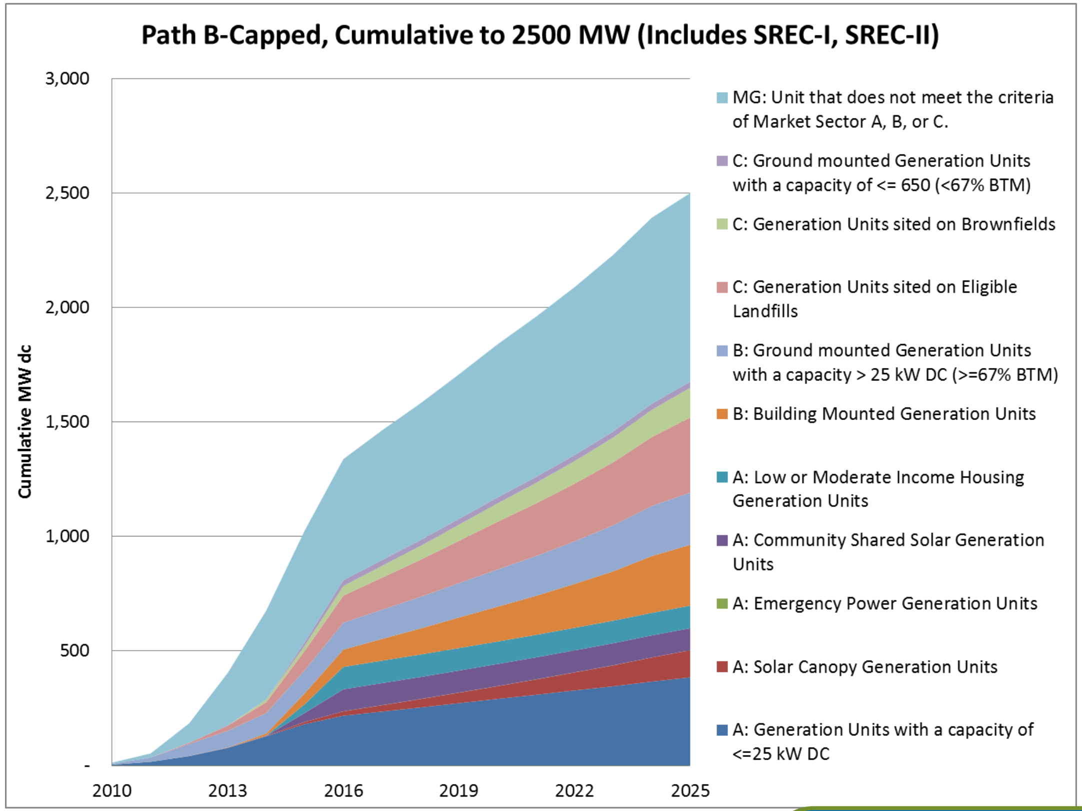
Path A, Uncapped, to 2500 MW

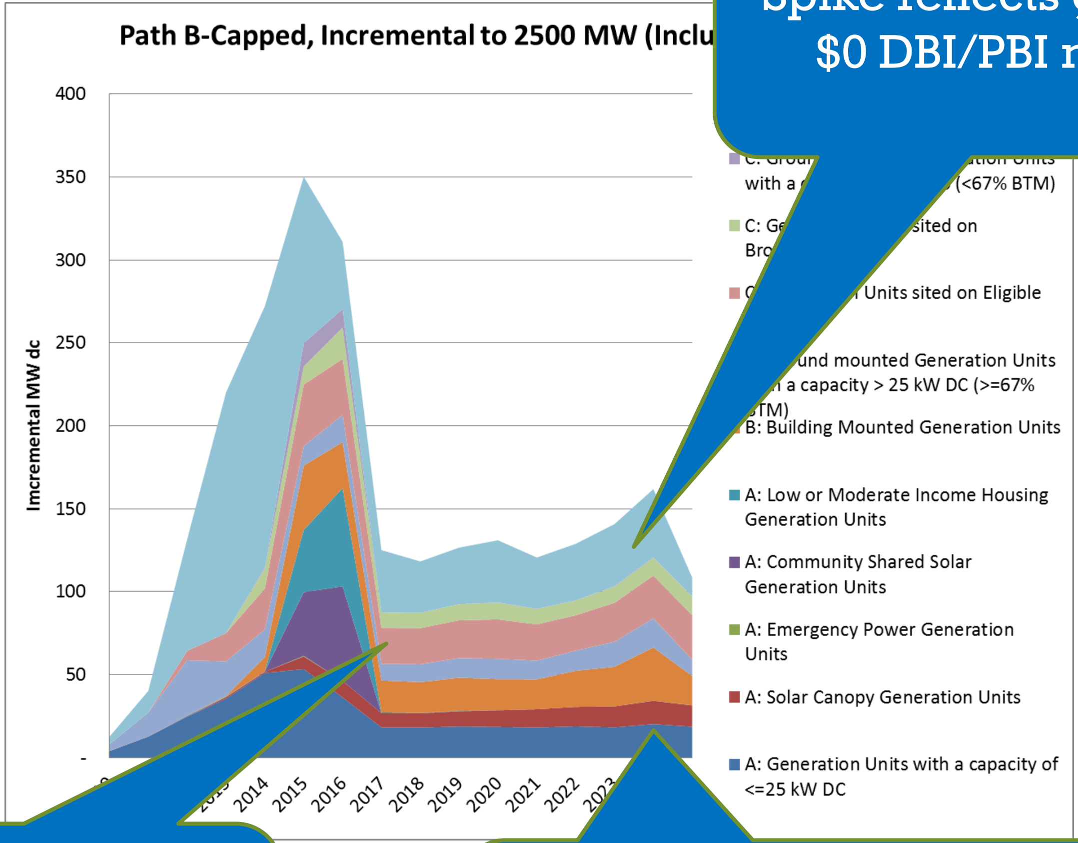




Engineered Growth via quotas in Bid System, optimized curve of DBI, Small Sector

Build-out By Type (SREC-II Subsectors)
Path B, Capped, to 2500 MW



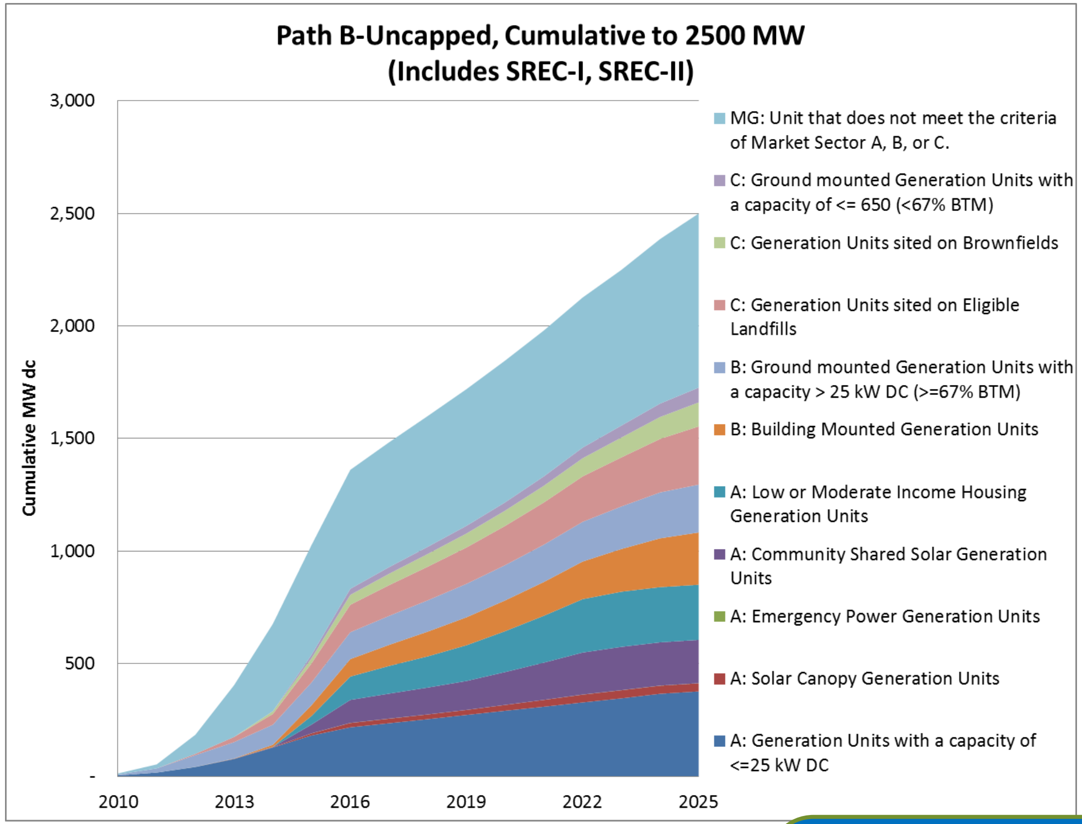


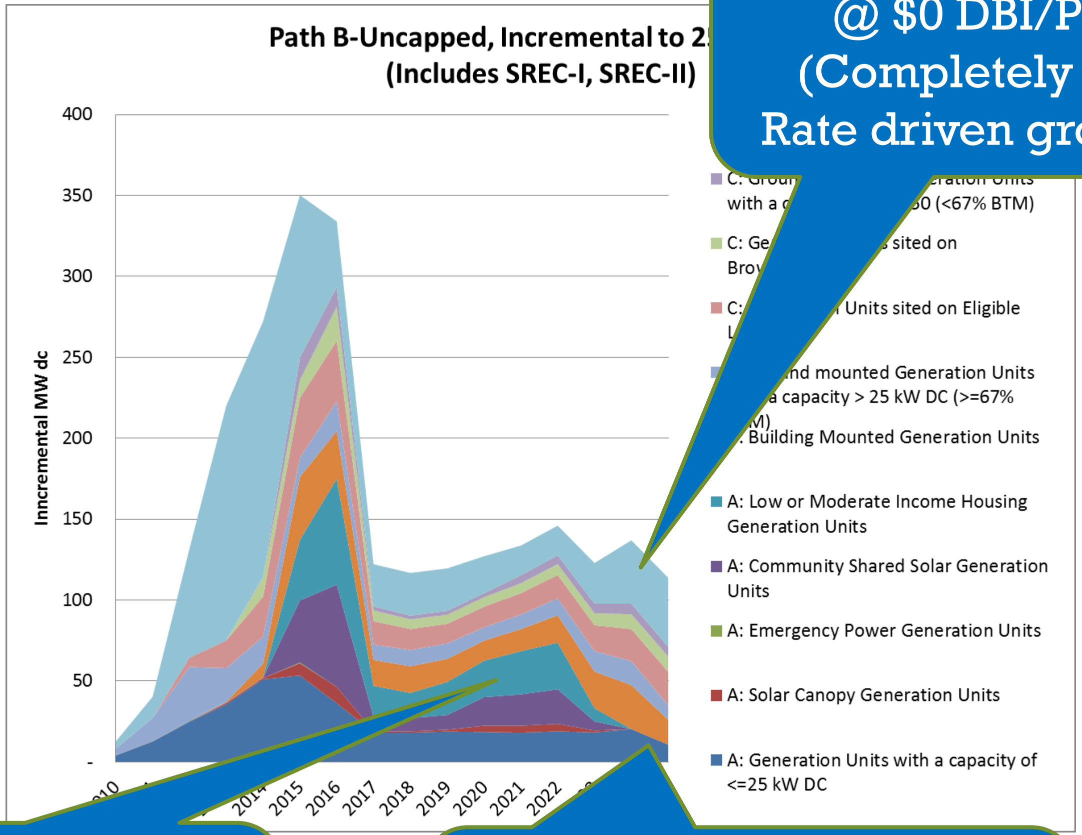
Spike reflects growth @ $0 DBI/PBI needed

Engineered Growth via, optimized decline of DBI. Higher potential for volatility v. Path A.

Faux Decline: program hits target 2025-Q2 (installs actually growing at accelerated rate here)

Build-out By Type (SREC-II Subsectors)
Path B, Uncapped, to 2500 MW



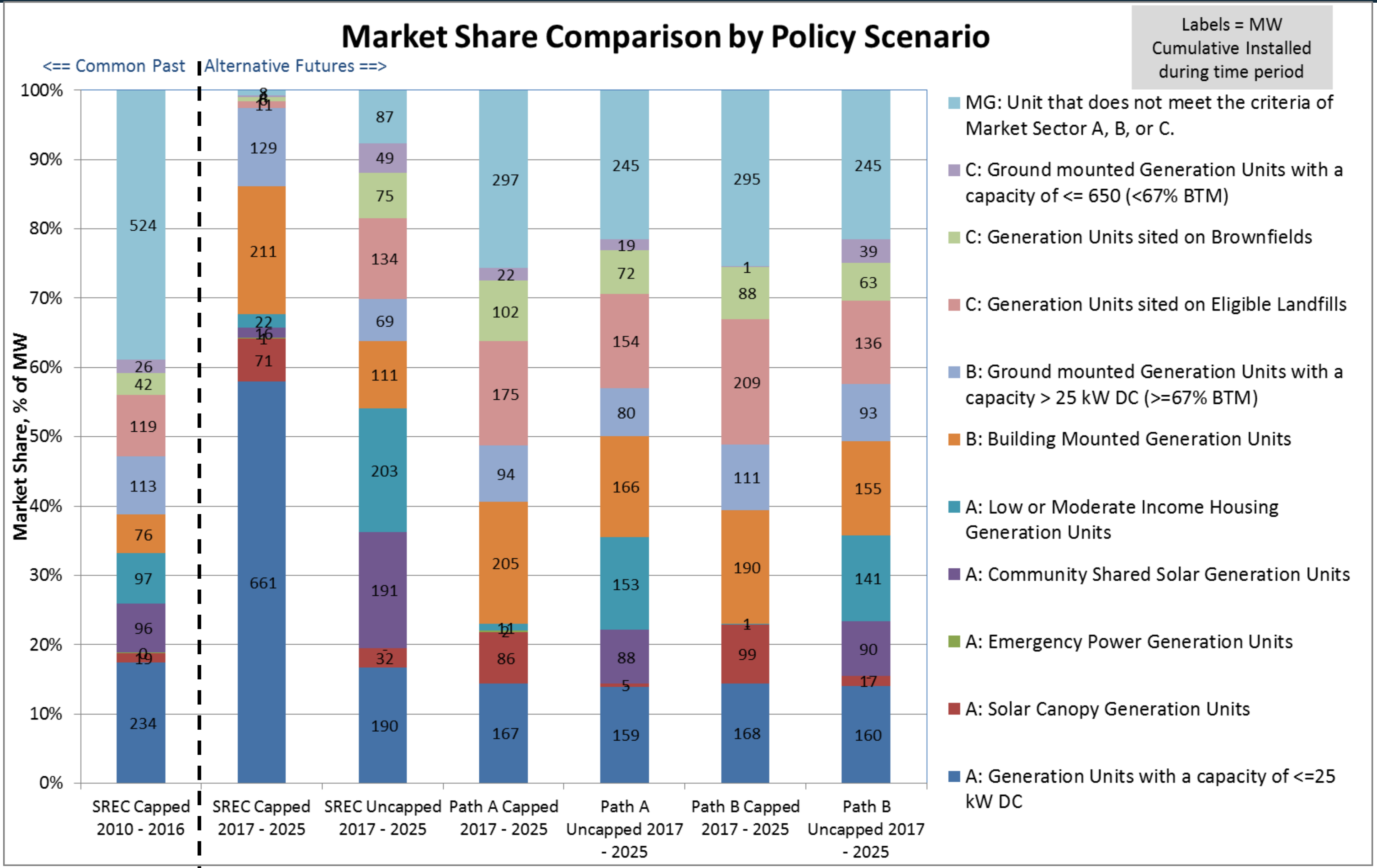


Spike reflects growth @ $0 DBI/PBI (Completely NM Rate driven growth)

CSS/VNM LIH growth cannot be controlled in open enrollment system @ current NM Rates

Faux decline: program hits target 2025-Q2 (installs actually growing at accelerated rate here)

Market Share Evolution Overview

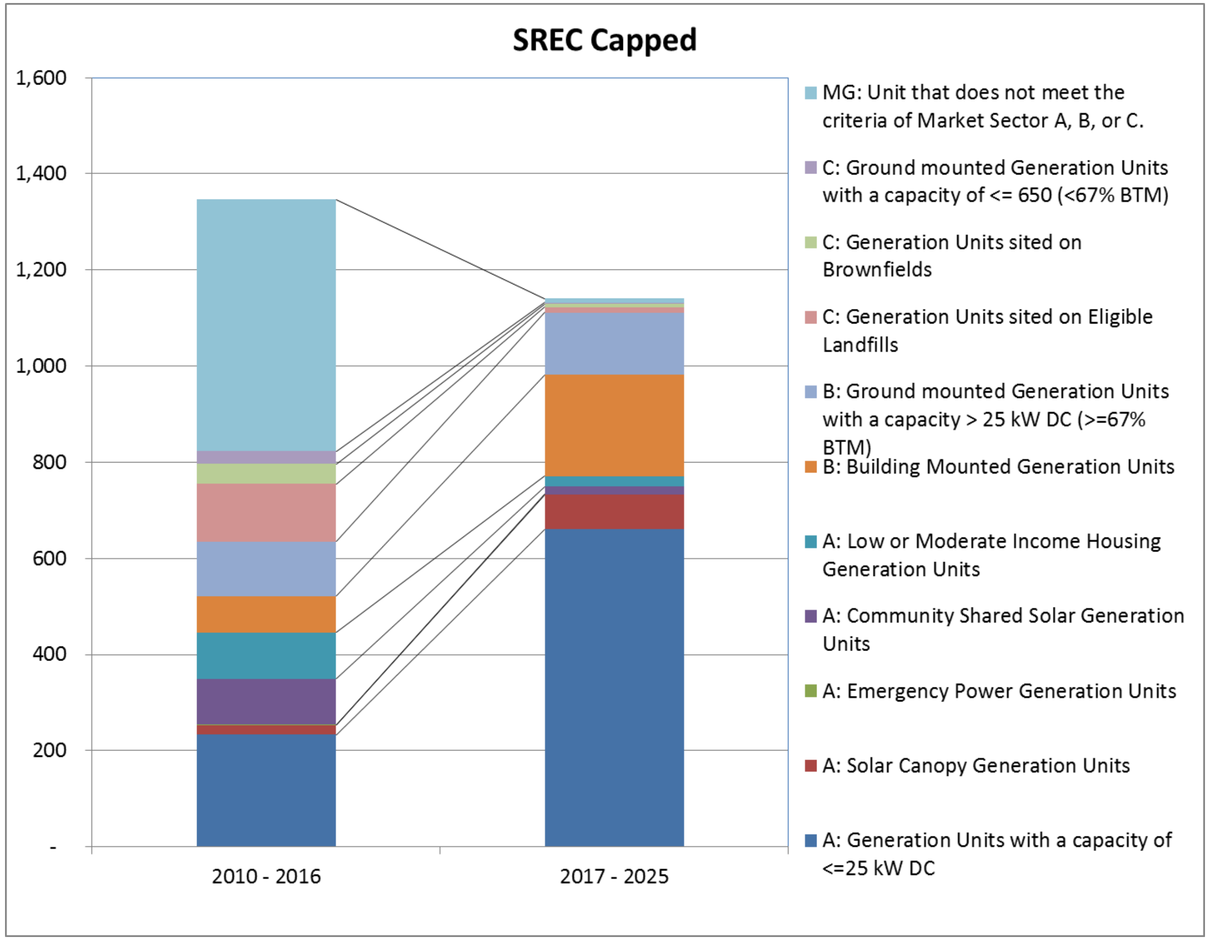


1326 -1349 MW

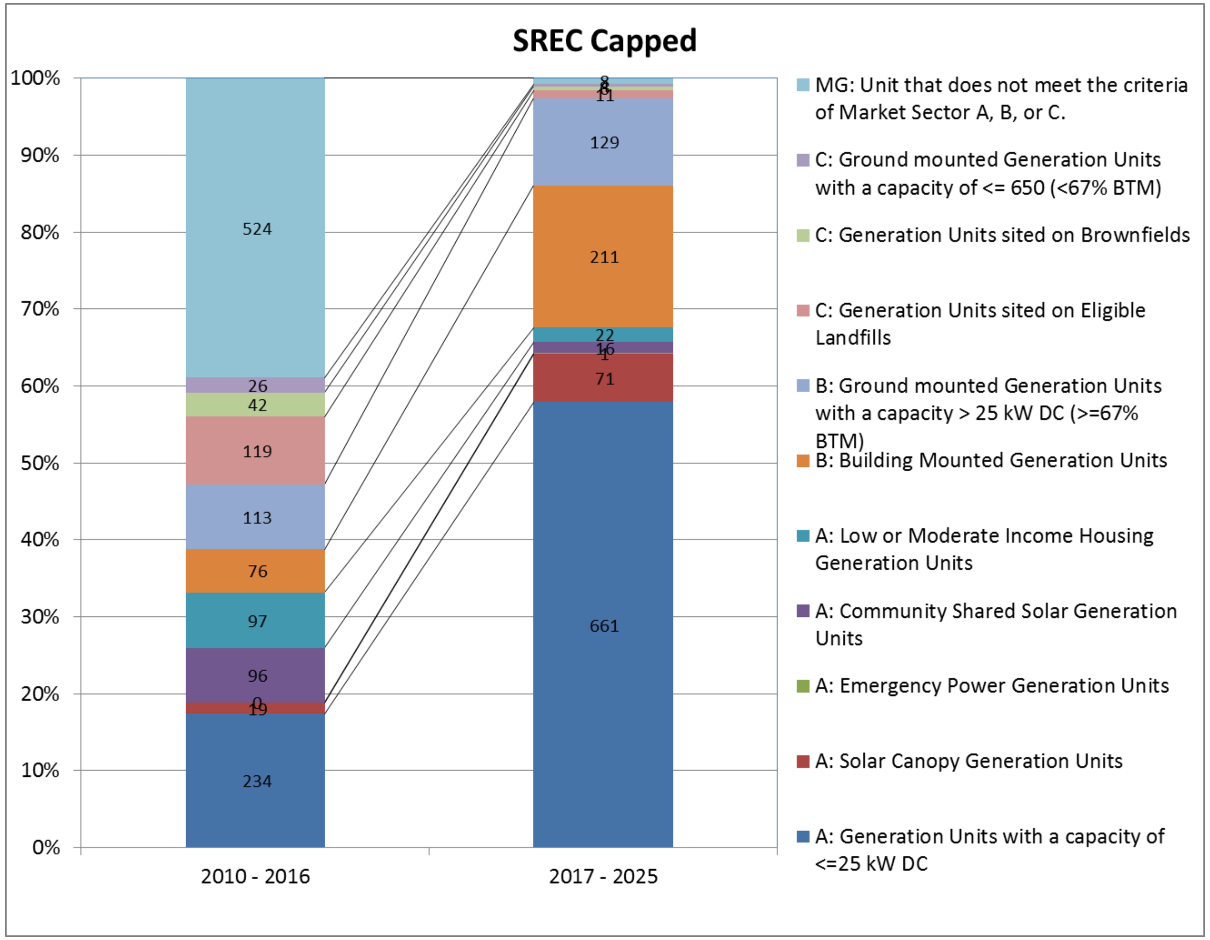
1139 -1162 MW

SREC Capped Market Share

By MW

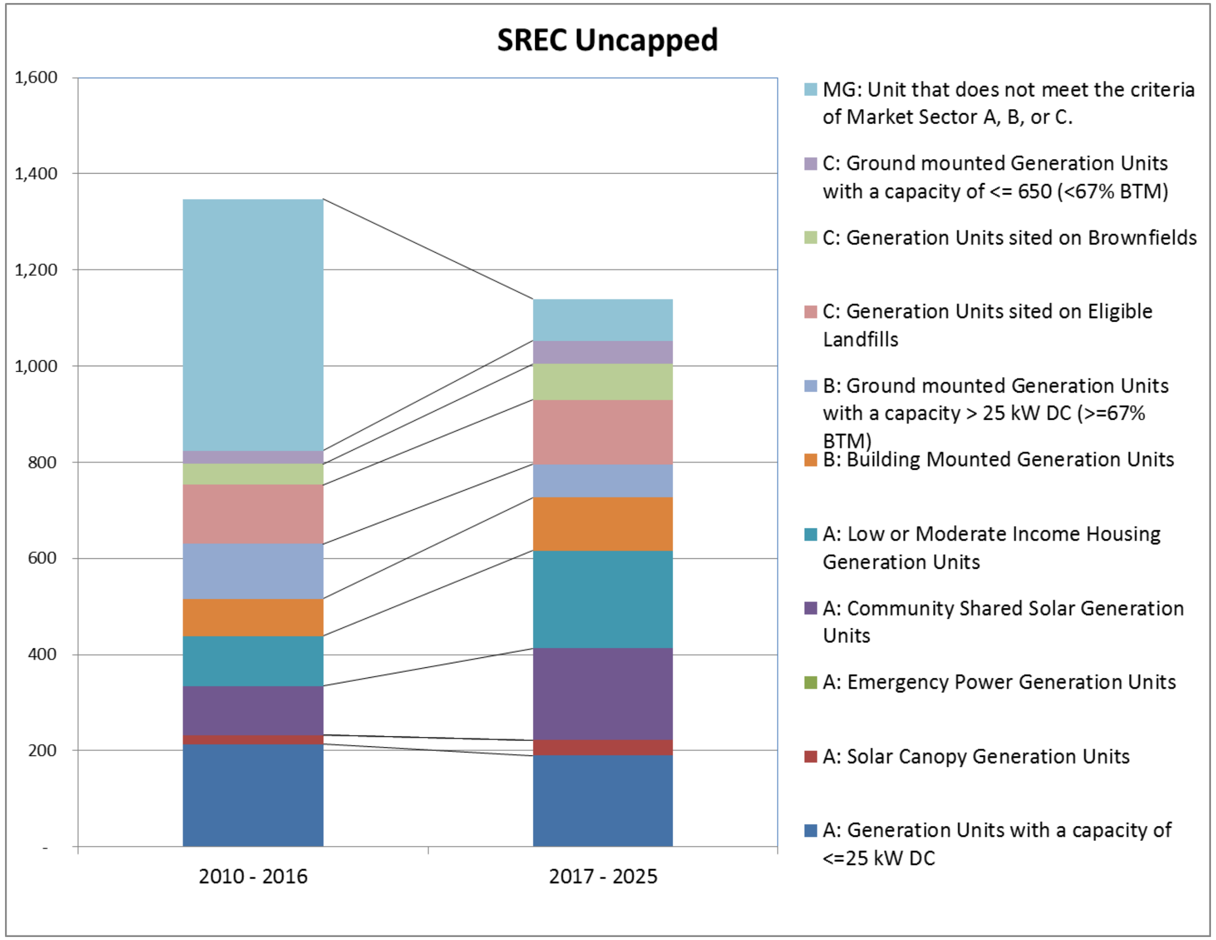


By %

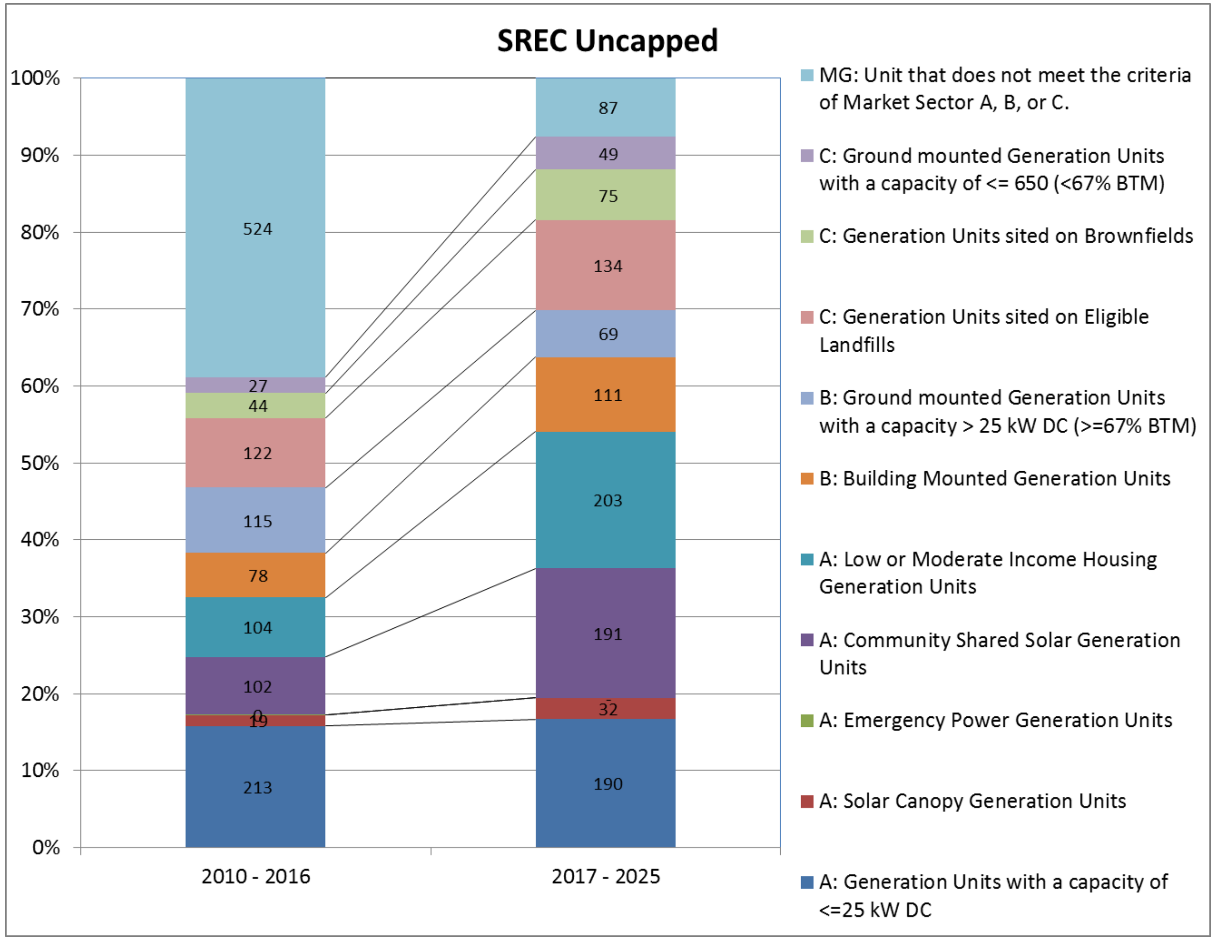


SREC Uncapped Market Share

By MW

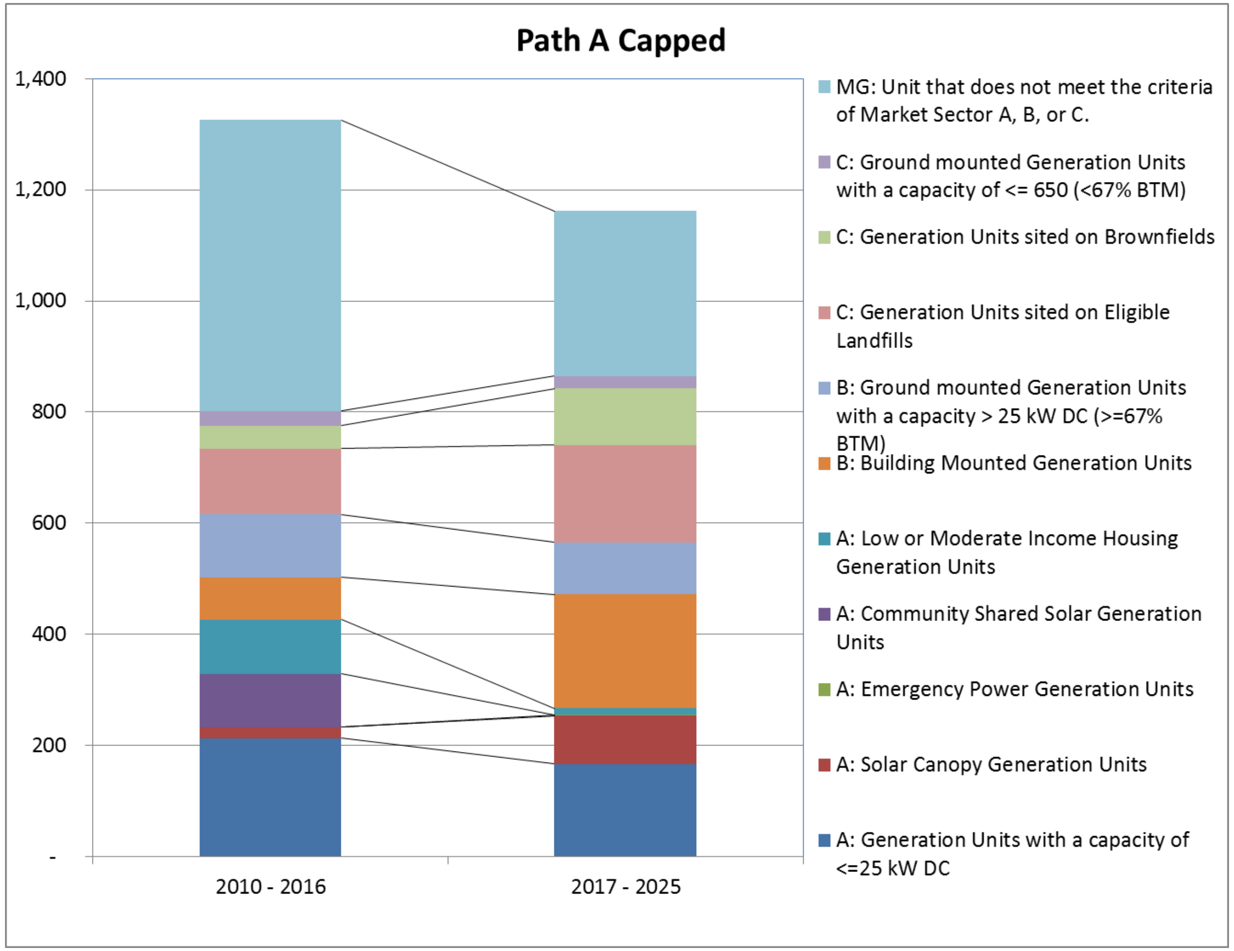


By %

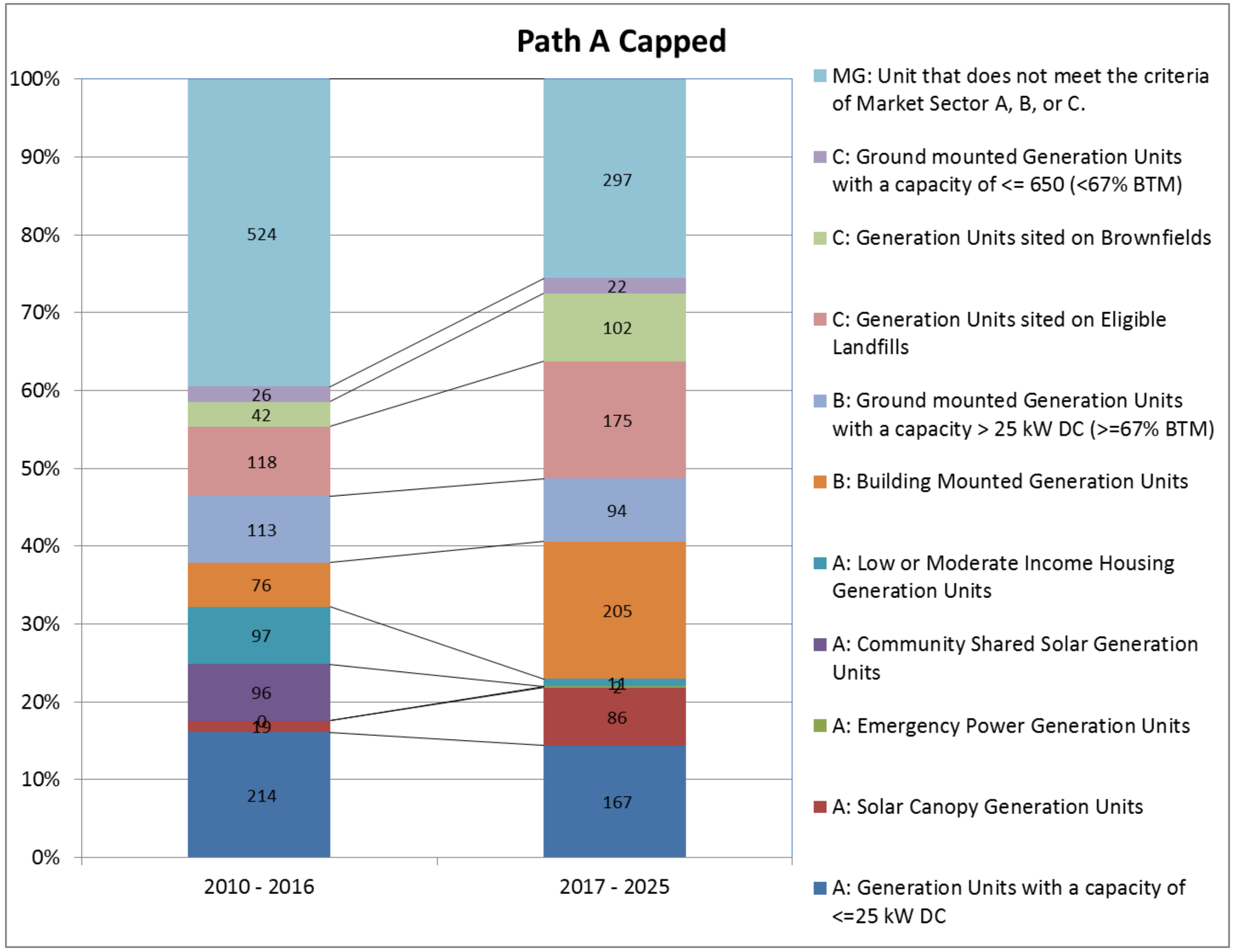


Policy Path A Capped Market Share

By MW

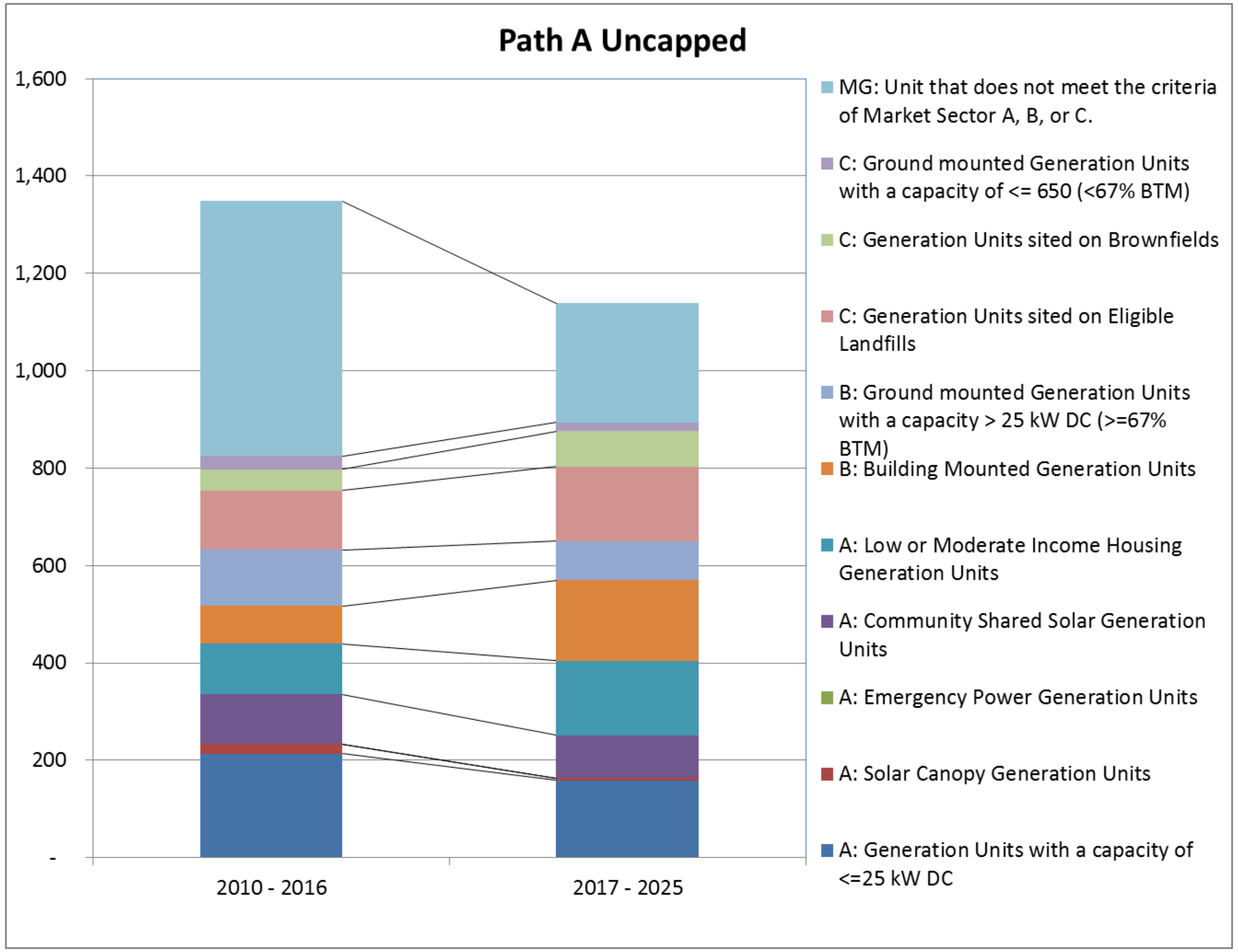


By %

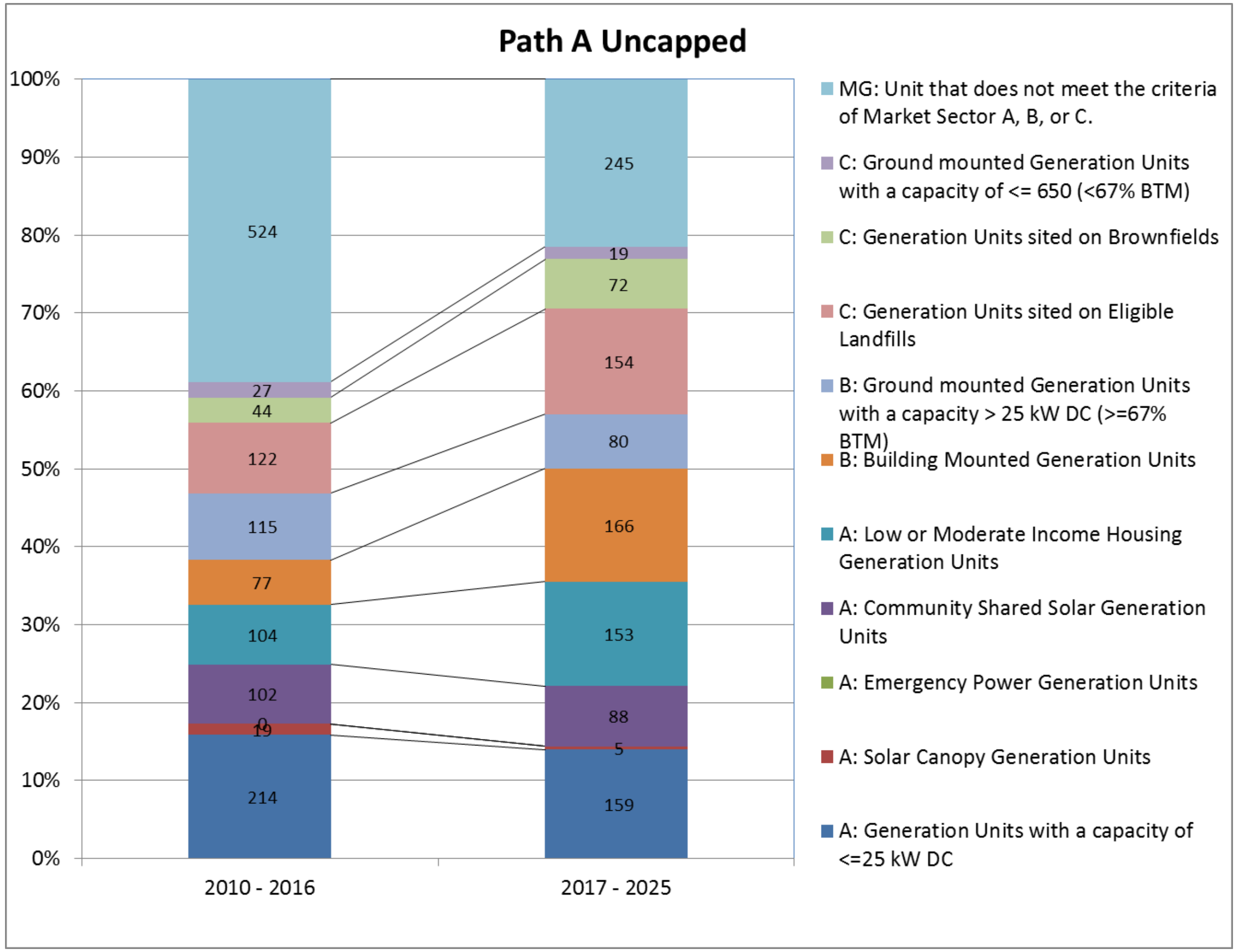


Policy Path A Uncapped Market Share

By MW

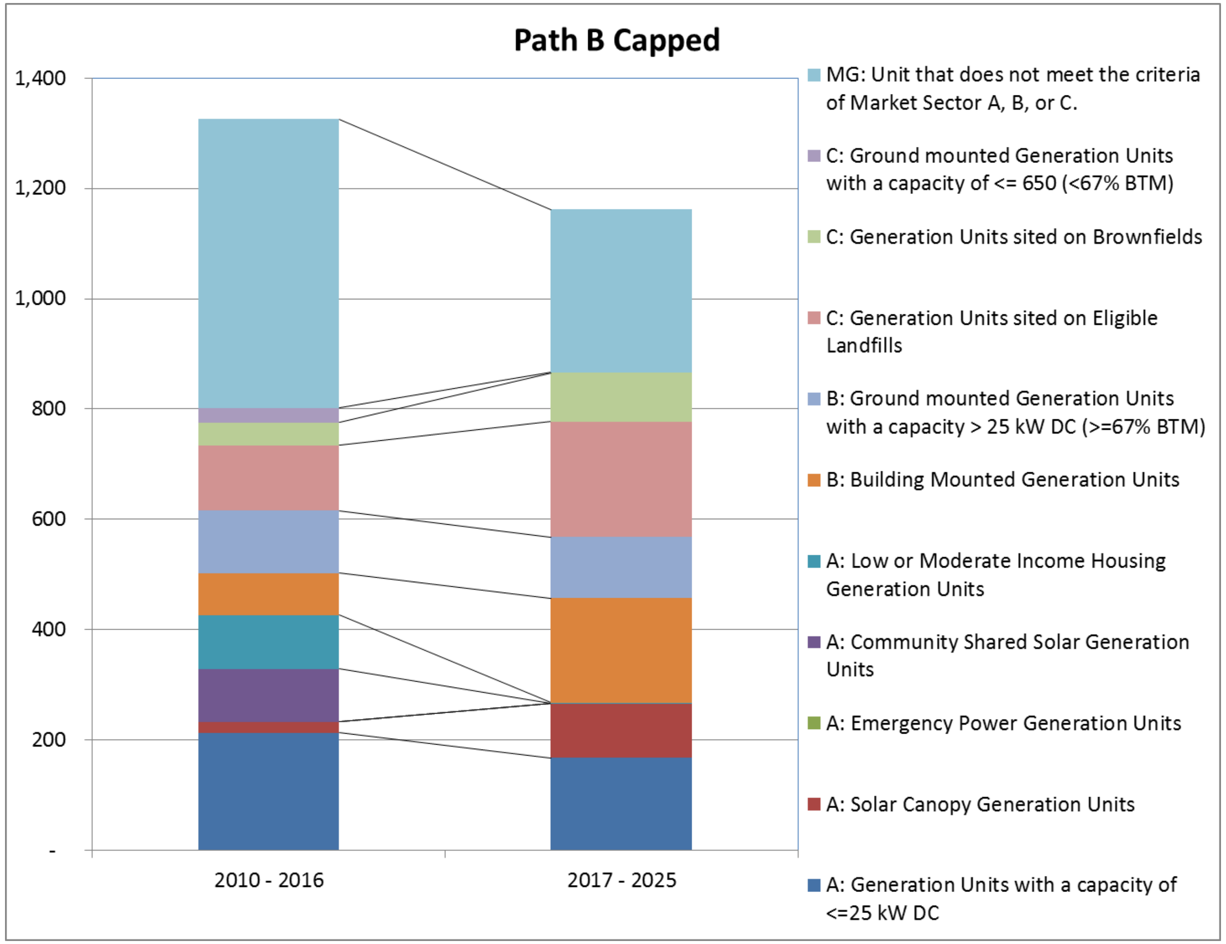


By %

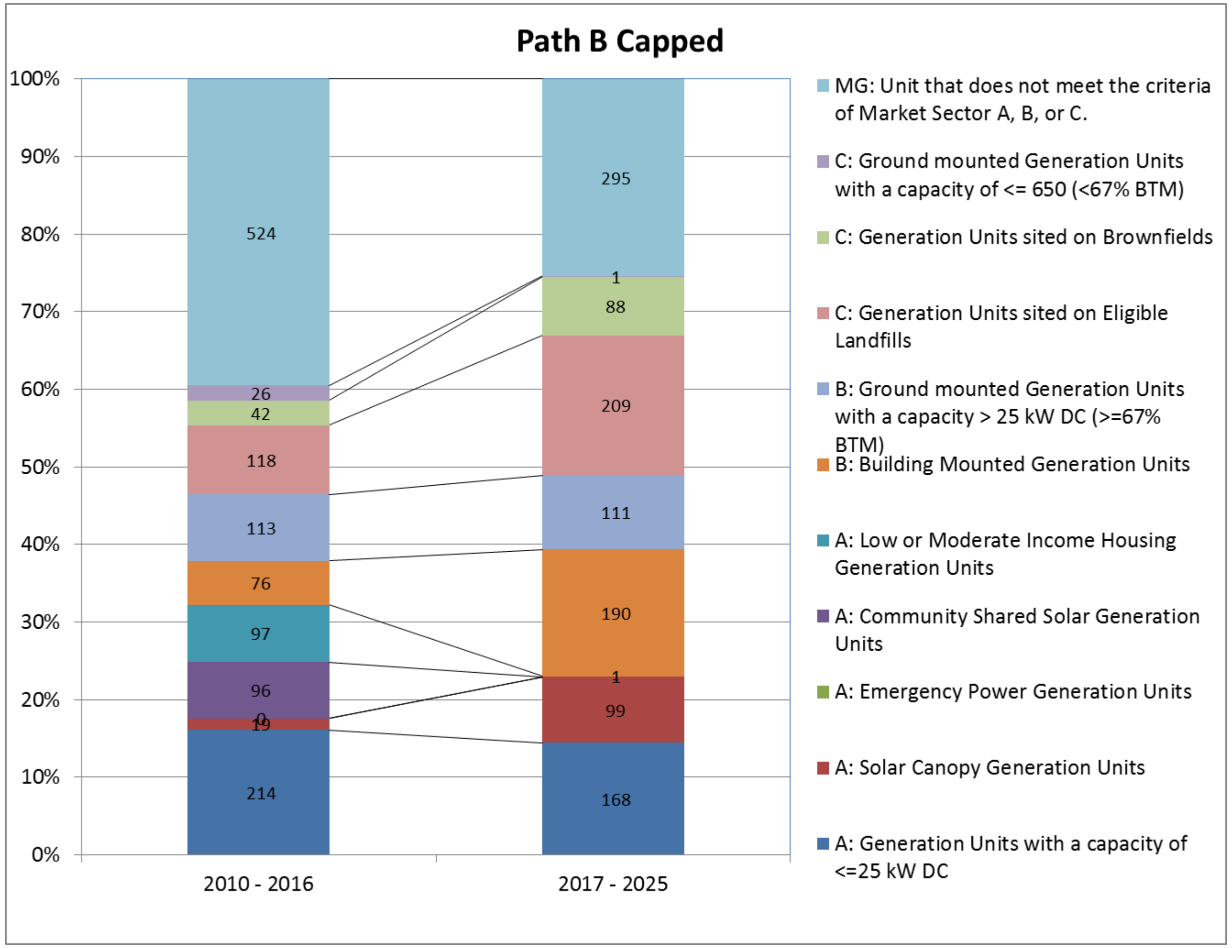


Policy Path B Capped Market Share

By MW

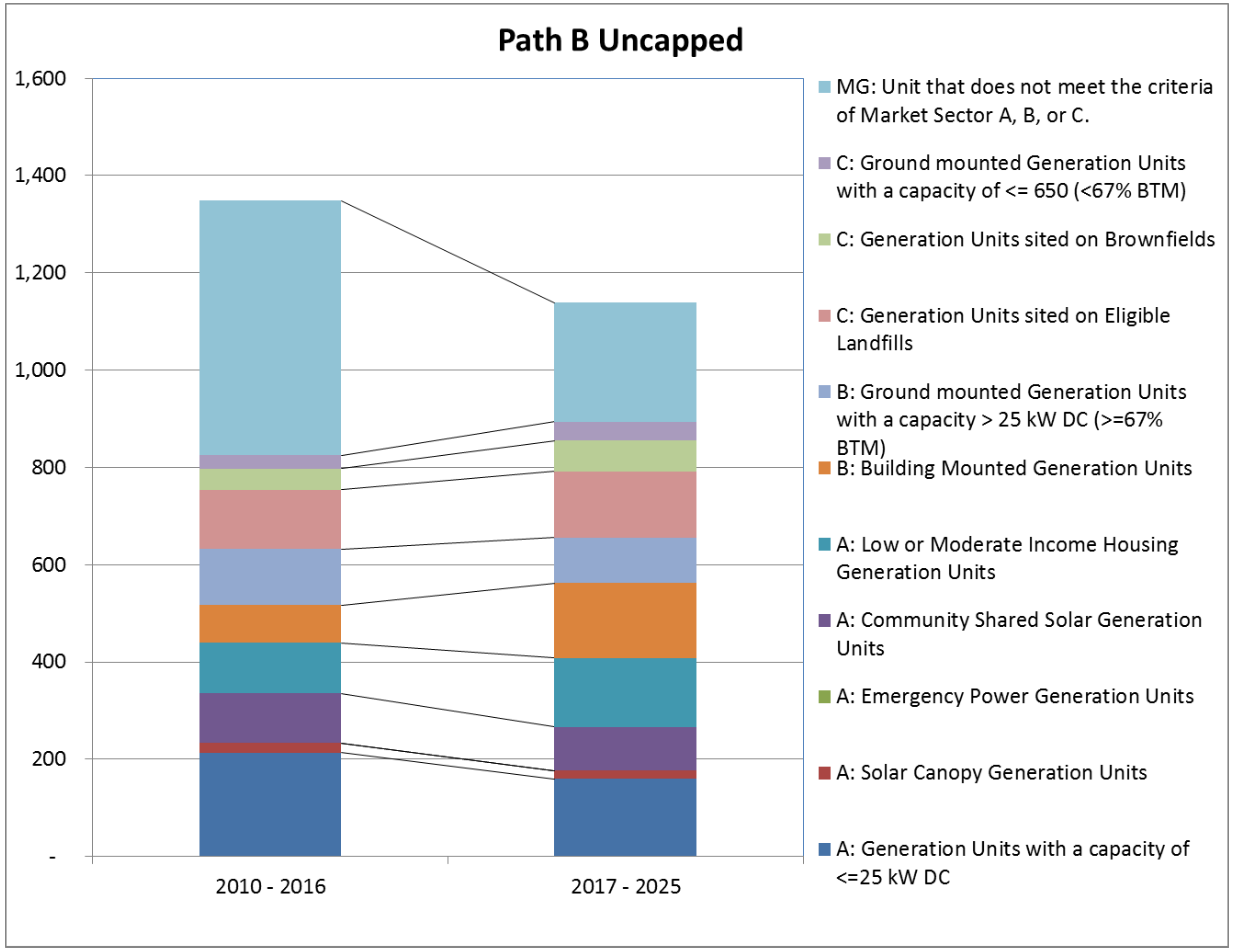


By %



Policy Path B Uncapped Market Share

By MW



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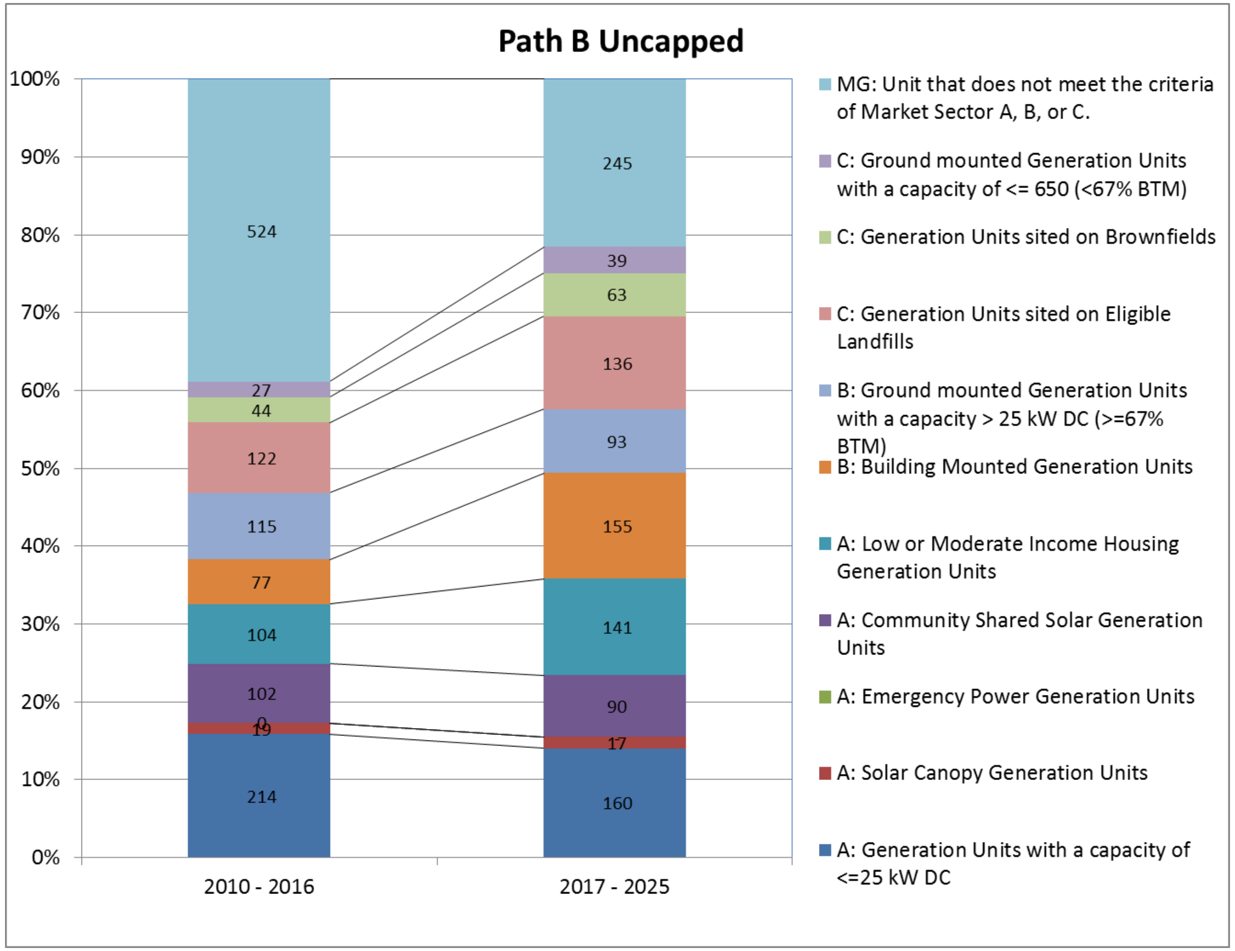


APPENDIX A-7
KEY CONSIDERATIONS FOR UNDERSTANDING RESULTS

SIMPLIFYING ASSUMPTIONS AND OTHER MODELING NECESSITIES

Key Considerations for Understanding Results:
Implications of Simplifying Assumptions (1)

1. **Retail Rate Structures Held Constant.** Assumed no change in retail rate structures from current, with respect to any shift from components billed on a per-kWh basis to fixed charges, customer charges, or the establishment of minimum bills. Task Force determined that rate design is important but best addressed before the DPU.
   - A future shift in rate structure away from kWh charges would reduce the avoided cost or revenue realized for behind-the-meter or net metered solar PV projects ➔ Would diminish economics, lead to a slower build-out and a potential shift among installation types unless solar incentives were increased to match (as might be the case under Paths A and B).
   - However, this analysis assumes that a subsector of the marketplace whose retail rate value is not hedged through fixed-price PPA or discount arrangements would derate expectations of future rate revenue to some degree to account for exposure to change of rate structure risk (i.e., host owned <= 25 kW systems under SREC or Path B)

2. **Distribution System Saturation Ignored.** Did not explicitly examine limitations on development caused by saturation of distribution feeders or resulting elevated interconnection costs. Considering such factors would slow the pace of development.(forecast of installations does consider interconnection timelines/constraints).

3. **Technical Potential Saturation Largely Ignored.** Did not explicitly constrain solar technical potential. However, modeling does consider land area, population density, number of residential customers and number of non-residential customers in regards to growth rates and relative potential among utilities. Paths A&B have low growth rates and are not likely to be constrained by technical potential, but are constrained by the policy mechanism itself. Path B is constrained economically. Separately, we have done research that did not find significant near term constraints on brownfield, landfills, or VNM low-moderate income housing sub-sectors.

Key Considerations for Understanding Results:
Implications of Simplifying Assumptions (2)

4. **Ignored Potential Differential Impacts of Installer Incentive Capture.** Did not explicitly assume or analyze installed cost inflation under the more 'generous' policy options (compared to less generous policies), an installer 'incentive capture' phenomenon cited by some analysts, or assume lower installed costs for Policy futures with less generous combined solar and NM incentives.

5. **Ignored Impact of ITC Qualification Peril at 1/1/17.** Did not reflect the likelihood that projects are unwilling to commit to projects with risk exposure to loss of ITC due to interconnection delay or labor shortages in 2016, which may in practice lead to a risk-aversion-driven drop-off in development. Simplified to assume a steadier rate of development influenced by economics and shifted some development back to earlier in the year as participants are well aware of the pending loss of ITC, the risk in being late and are starting development activity earlier.

6. **Assumed Municipal Light Plants Participate Like IOUs in Policy Paths A & B.** MLPs are assumed to participate in Policy Paths A&B the same way as do investor owned utilities (including allowing or not allowing virtual net metering in capped and uncapped scenarios). We treated all MLPs as having a single prototypical rate structure based on Taunton Municipal Lighting Plant rates.

7. **Assumed Future LSE Participation in SREC Floor Price Auctions.** LSEs will fully participate in auction and thus hold marginal SRECs during the auction out years. If LSEs continue to stay on sidelines, it causes extreme additional expenses for NPRs ➔ seems imprudent to assume that this practice would continue indefinitely.

Key Considerations for Understanding Results:
Implications of Fixing the MW Targets

- 2500 MW by 2025, as a modeling benchmark for ‘beyond 1600 MW’, represents a substantial contraction of the industry annual build rate
    - Important to keep in mind that some sectors would not be largely impacted by policy changes and would continue to be viable, while others would no longer be viable. *Industry would most certainly contract with loss of ITC and net metering, all else held constant, until solar costs decline materially.*
- Modeling results are driven in large part by fixing a target of 2500 MW and *trying* to set incentives so they reach that level in 2025, and tallying what will be built under those circumstances and at what cost.
- Some of the C/B results are (initially) counterintuitive
- This approach allows comparison of Costs & Benefits without conflating impacts driven by the volume of production (which drives many benefits) and the solar and NM incentive costs, which avoids masking important policy impacts that differ by virtue of different penetration.
- If instead we had held incentives constant (and let MW vary)… NM capped paths would have slower build-out
    - → Competitive procurements (Path A/Large) → entirely driven by targets (pay whatever needed)… the volumes under Paths A and B may have differed materially, depending entirely on the basis selected for setting incentives.

Other Key Considerations for Understanding Results:
"Gate-Keeper" and "No Negative Bid" Modeling Assumptions (1)

- **Under Paths A and B, the MW built are not allowed to exceed 2500 MW even though economics would unleash additional building when levelized costs fall below levelized retail rate revenue.**
- **Cannot bid for a combined incentive less than the avoidable retail rate under Path A.** Model assumes that a project cannot bid lower than the levelized 15-year value of Rate-Based incentives ("Levelized per-kWh Rates") it is forecasted to receive (i.e., it cannot bid a negative solar incentive).
- Modeling efforts *implicitly* assume, for Policy Paths A&B, that a Project can only receive Net-Metering or avail itself of avoiding kWh components of retail rates (as opposed to Solar Incentives, i.e. SREC, PBI, EPBI) if they participate in the modeled Solar Incentive Program (i.e., there is a Gatekeeper on use of net metering; and a project can't interconnect unless it goes through the program).
  - This assumption has no effect on installation projections in Path A-Small, and Path B-Small and Large Forecasts.

Other Key Considerations for Understanding Results:
"Gate-Keeper" and "No Negative Bid" Modeling Assumptions (2)

- The net metering Gatekeeper assumption impacts installations under Path A-Large in 2 ways:

1. **Prevents substantial additional building beyond the 'quota'.**
   - Path A Large is Quota-Driven (unlike SREC and PBI/EPBI). If (i) Rate-Based incentives alone are sufficient for a greater number of MW of Projects to be installed in a quarter than the solicitation's quota, and (ii) Path A Large program is *not* administered as a "gatekeeper" type program ➔ then Model under-forecasts MW installed in that quarter (because some projects could be built with no solar incentives and only rate-based net metering **or** avoided retail rate incentives). Without a net metering Gatekeeper in NM Uncapped Scenarios, model predicts 100s of MWs of additional Sector A projects that would lean on VNM and would get built in the 2020-2025 timeframe.
2. **Shuts down development in high-rate utilities first.**
   - Different utilities provide different Rate-Based incentives. Because of *no negative bids assumption*, the Combined Incentive from marginal bidder (e.g., from a project in WMECo) is in some cases lower than the projected Levelized Rates offered in certain utilities (e.g., NGRID and Unitil). The result of this is that, when marginal Combined Incentive and a utility's Levelized Rates cross, projects in these utilities (e.g., NGRID and Unitil) will be undercut by projects from other EDCs (e.g., WMECo) and in practice can no longer compete. This shifts installations, over time, to the utilities with the lowest Levelized Rates. This shift manifests in Sector A, in Net-Metering Uncapped Scenarios.

Other Key Considerations for Understanding Results:
Reallocation of Targets under Policy Paths A & B, NM Capped

- Under Policy Paths A&B, large Sector shares of target MWs were set at 25%.
- We project CSS and VNM-LIH comprise most of **Sector A/Large** in 2015-16 SREC-II program (>90% of Sector A installed MW by end of 2016). But, these project types are effectively precluded with no NM.
- ➔ When NM is capped, reallocation of **Sector A/Large** targets required to meet overall targets.

Reallocation of Target Potential when NM capped:

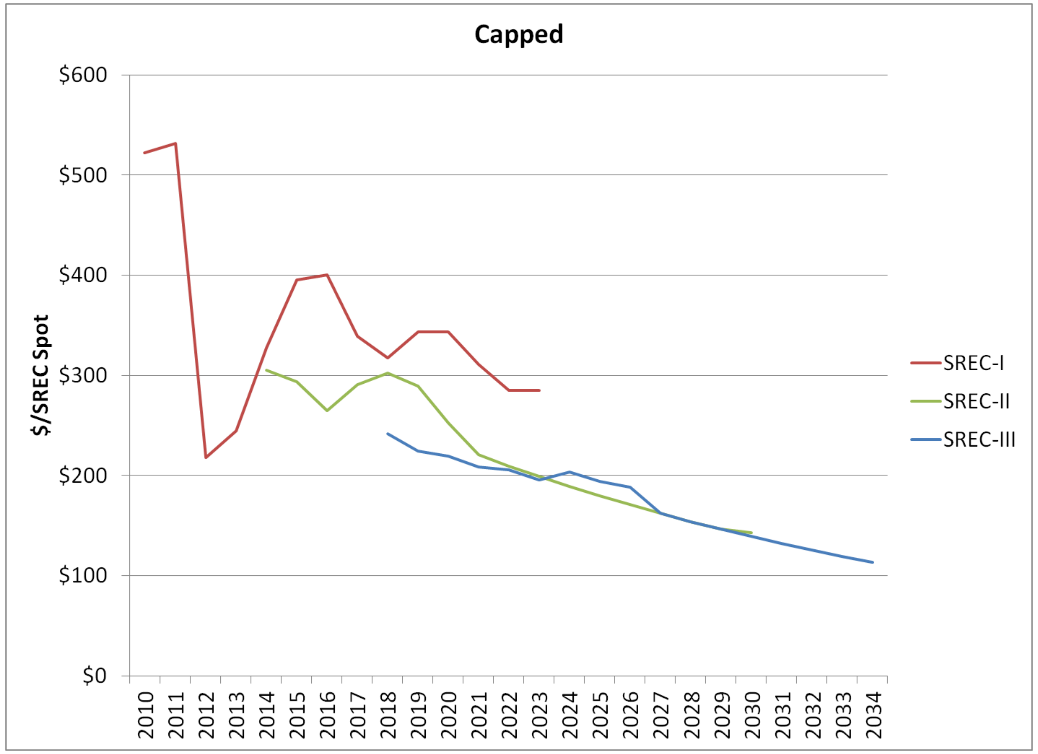
- With NM capped, Sector A is left with only Solar Canopy, Onsite LIH & Commercial Emergency.
- Underlying diversity objective ➔ try to develop as much in Sector A as feasible, but without CSS/VNM-LIH, 25% target technically infeasible ➔ Analysis suggests that 10% target is technically feasible (at high PBI prices).
- Remaining 15% of MW target was redistributed evenly among Sector B, Sector C and Sector D(MG).
  - Supply curve resource potential for CSS & VNM/LIH projects shifted to Sector D ➔ can install more MW at same incentive.
- Counterintuitive impact (higher costs when NM is capped) is a result of meeting the same overall 2500 MW by 2025 targets with a different mix of project types

SOLAR POLICY INCENTIVES

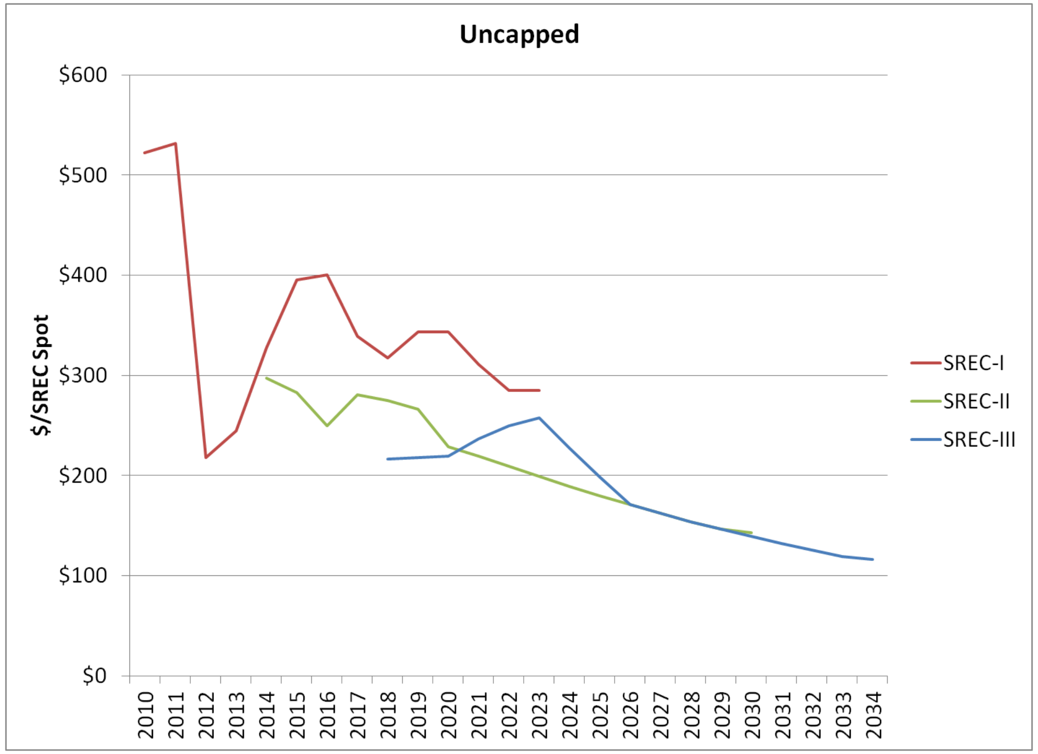
SREC, PATH A, PATH B

SREC Prices

Capped



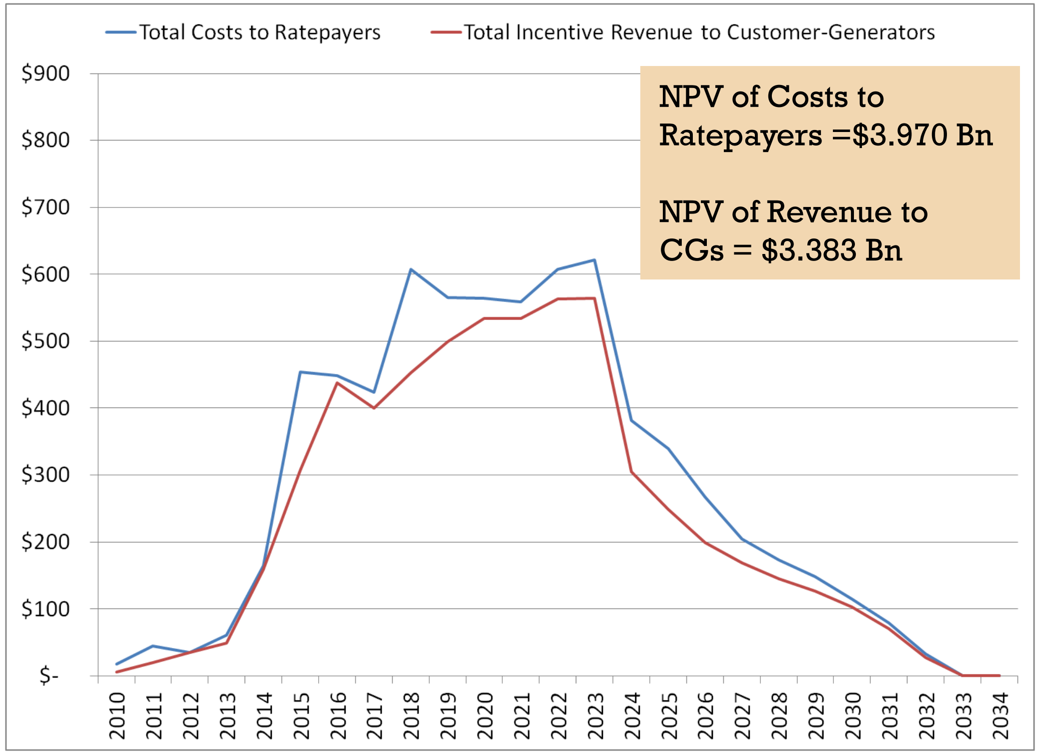
Uncapped



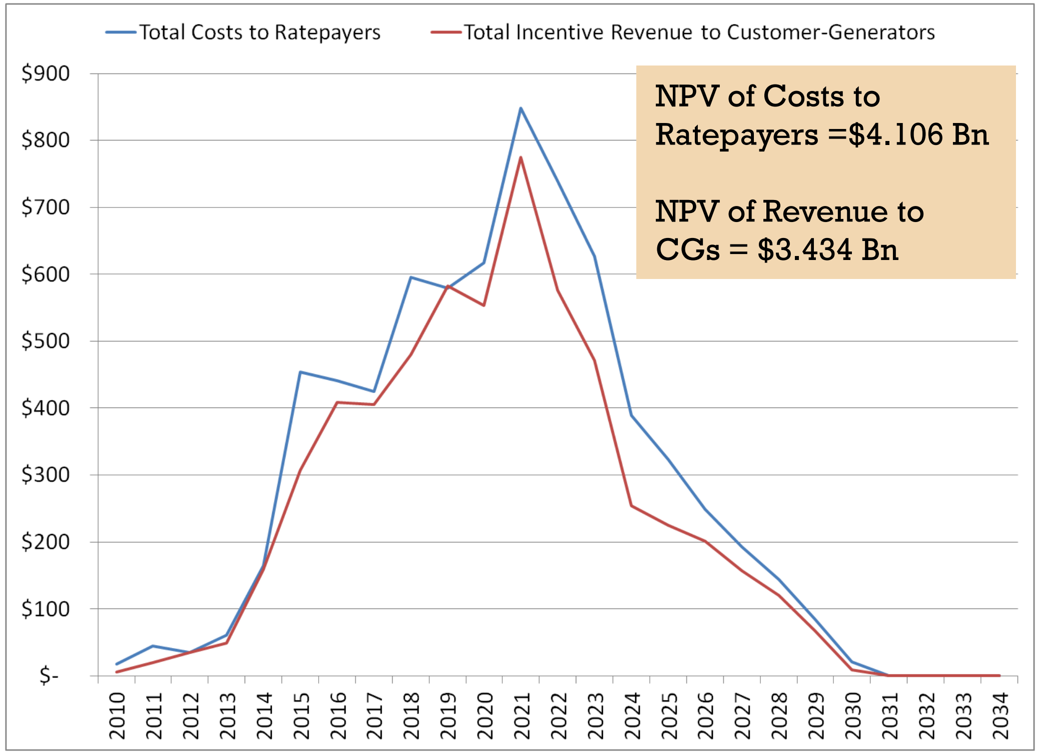
Projected prices are rolling 3-yr averages of results from SEA's proprietary MA-SMS Market Model.

SREC-I/II/III Policy $$ Comparison:
Revenue to Generator vs. Cost to Ratepayer (SRECs & SACP)

Capped (SREC-I, II & III)



Uncapped (SREC-I, II & III)

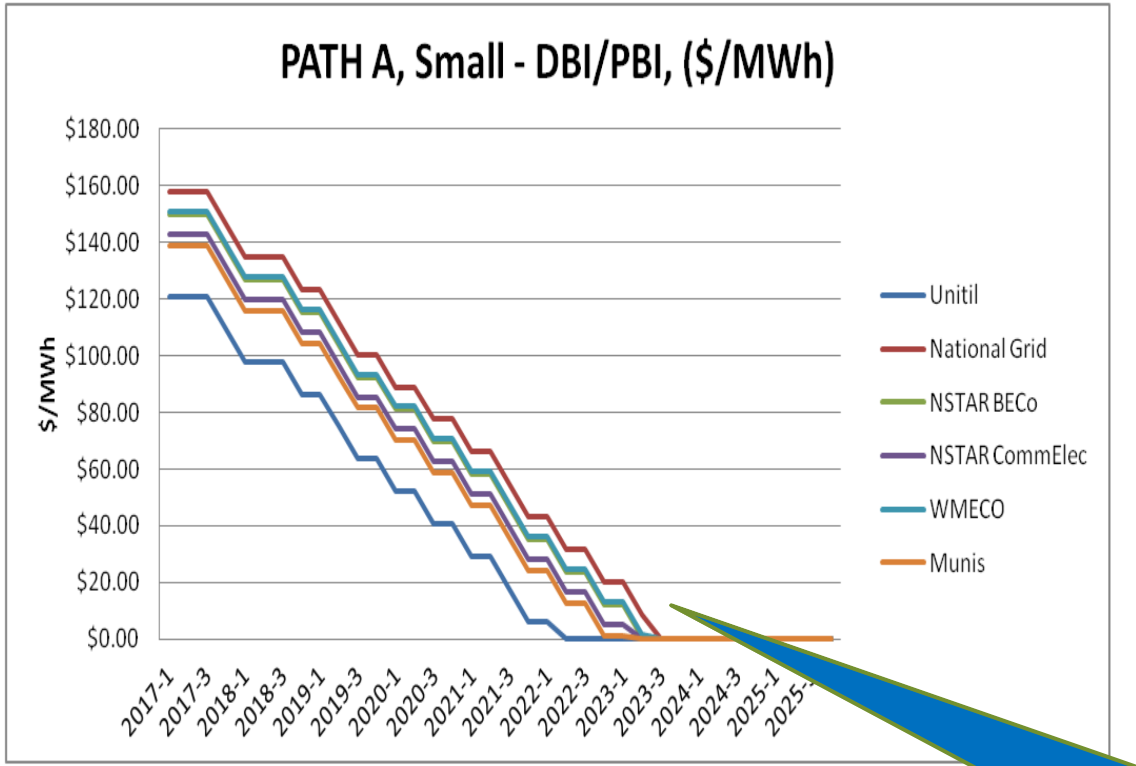


Annual differences caused by combination of timing of sale to vs. LSE use over different years, auction participation, and hedging with market makers

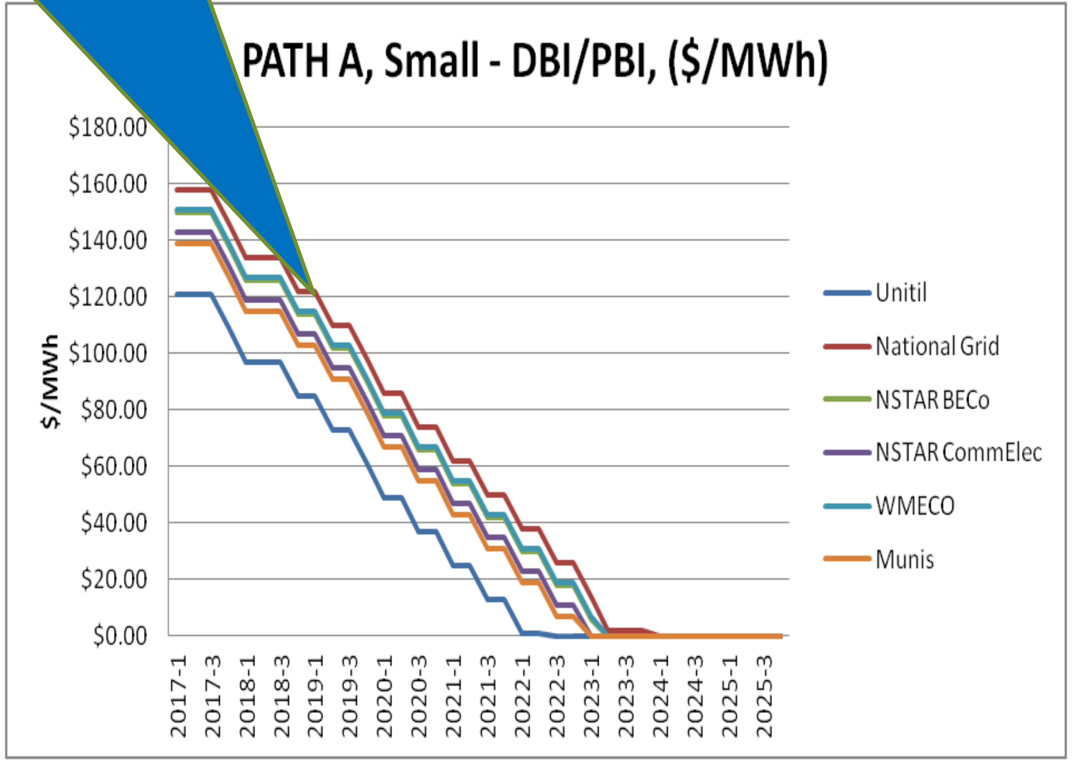
Policy Path A – Small Residential DBI/PBI

Slightly different DBI clearing speed function of slightly different starting tech. potential (**extremely** marginal effect)

Capped



Uncapped

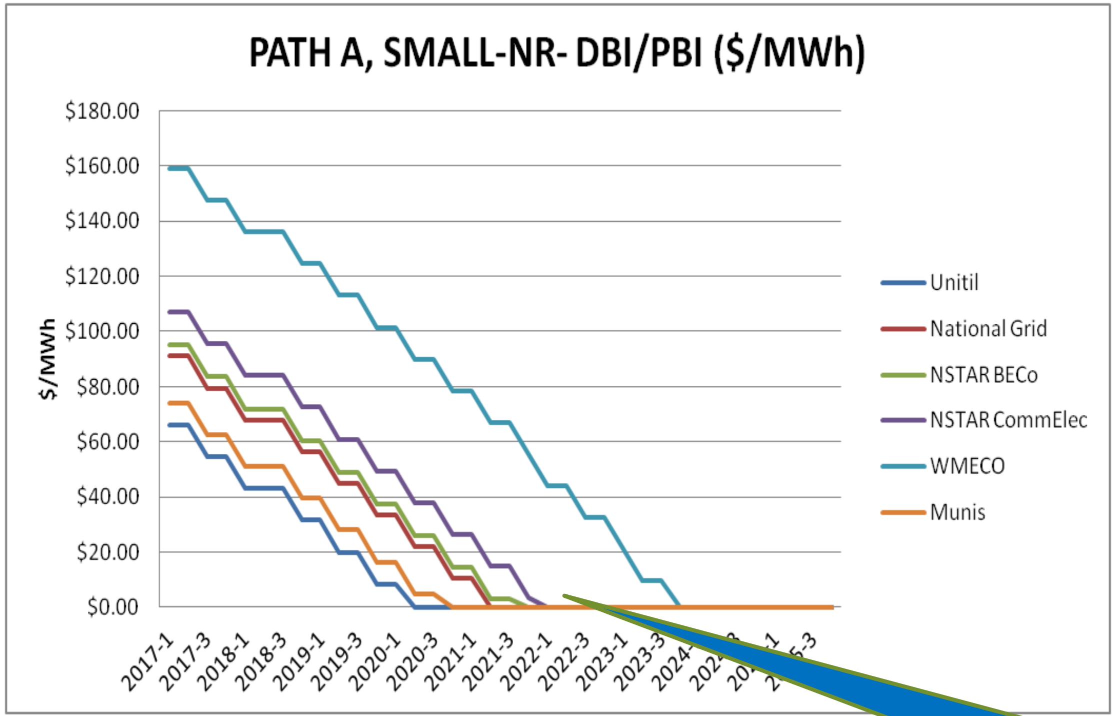


No PBI incentive needed Post-2023-Q2

Policy Path A – Small Non-Residential DBI/PBI

Slightly different DBI clearing speed function of slightly different starting tech. potential (**extremely** marginal effect)

Capped



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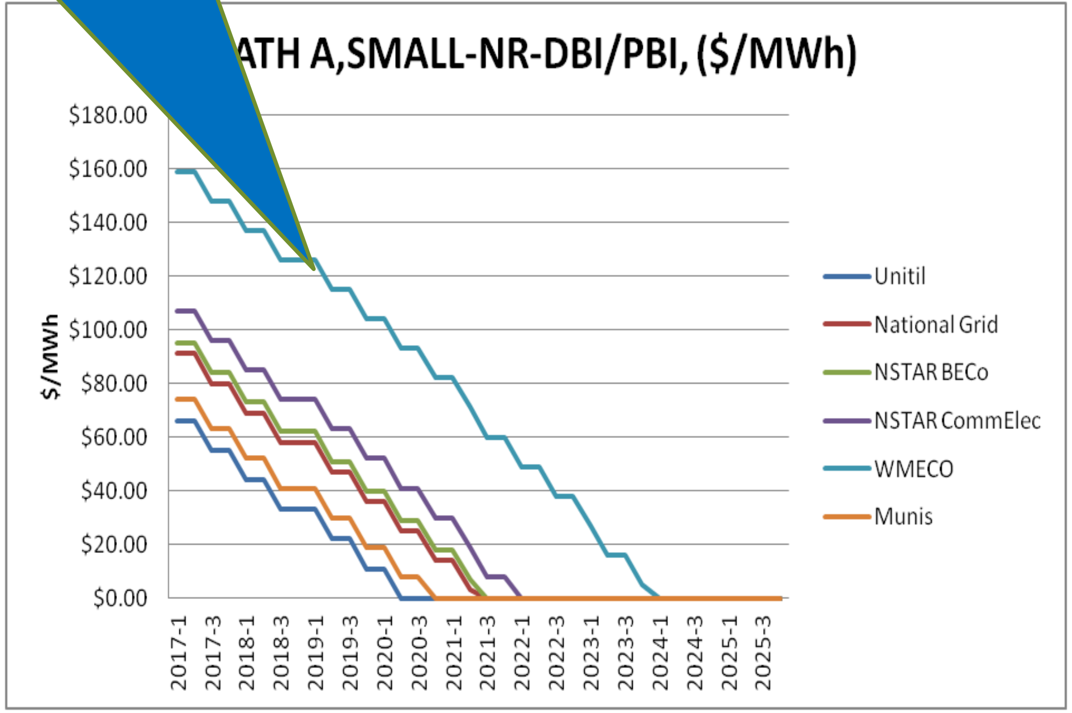
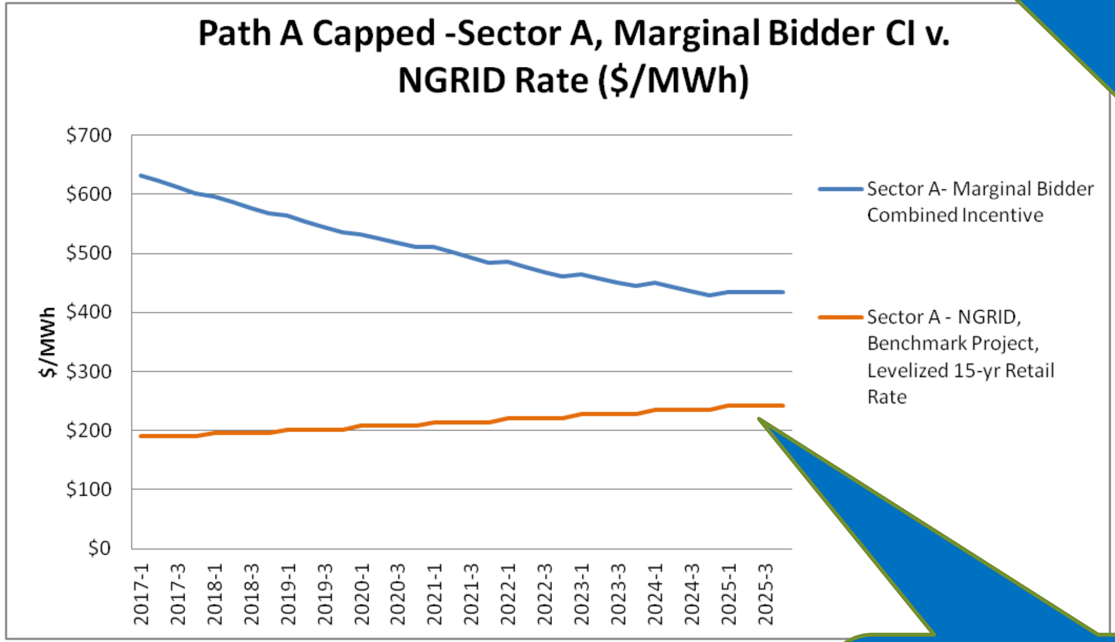


No PBI incentive needed Post-2021

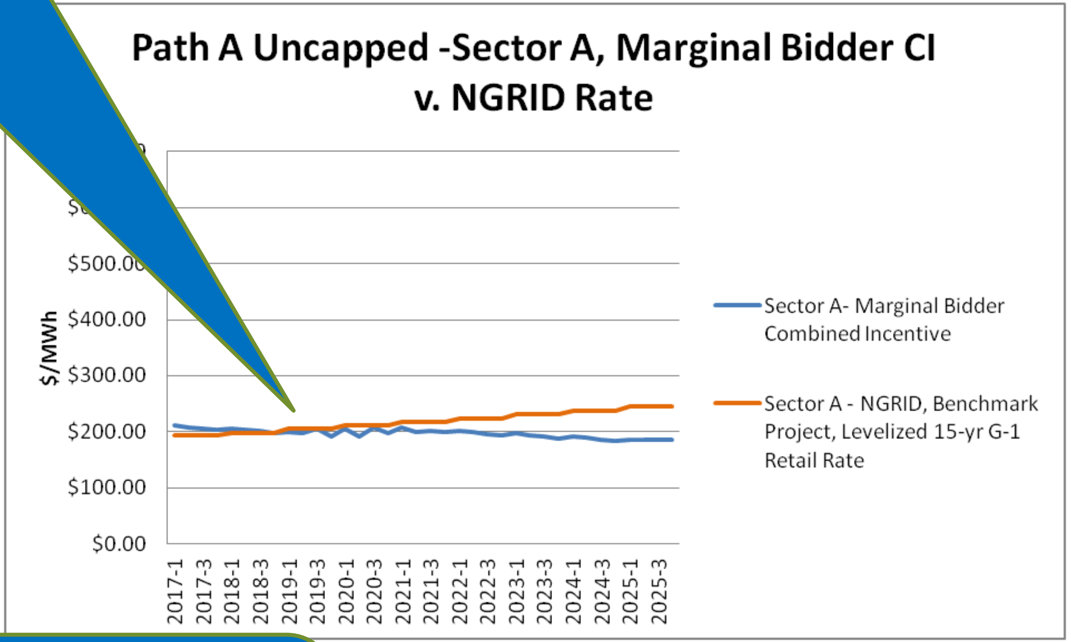
Policy Path A – Large Competitive PBI – Sector A

When lines cross, Sector A which is dominated by CSS and VNM LIH do not need PBI with VNM.

Capped



Uncapped

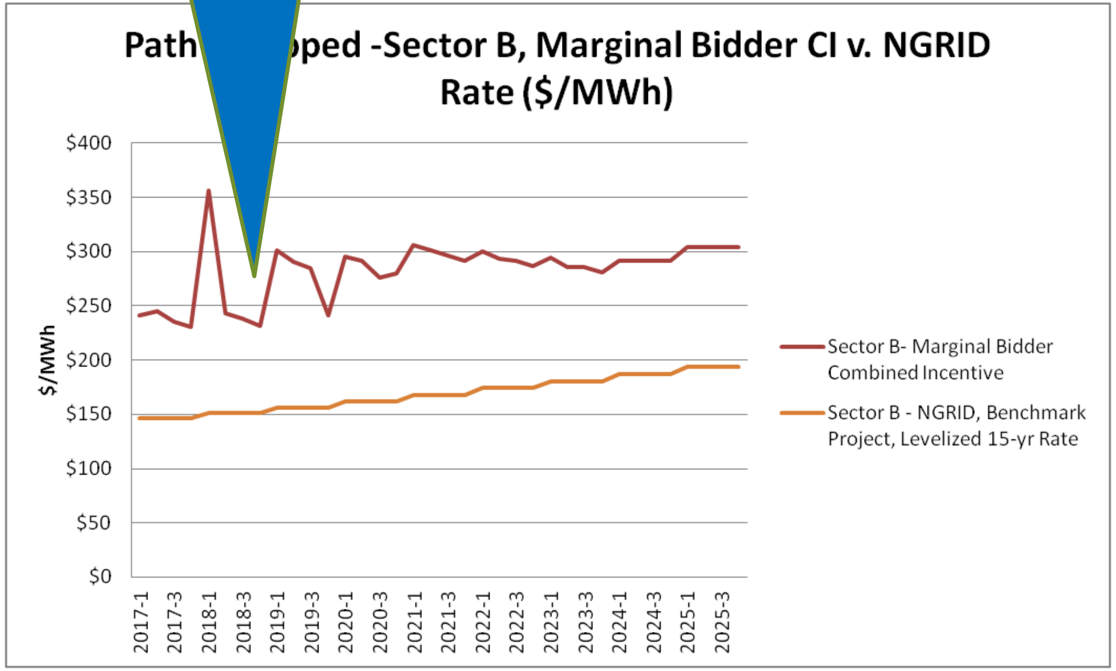


Marginal bid moves to convergence with rates, all Sectors.

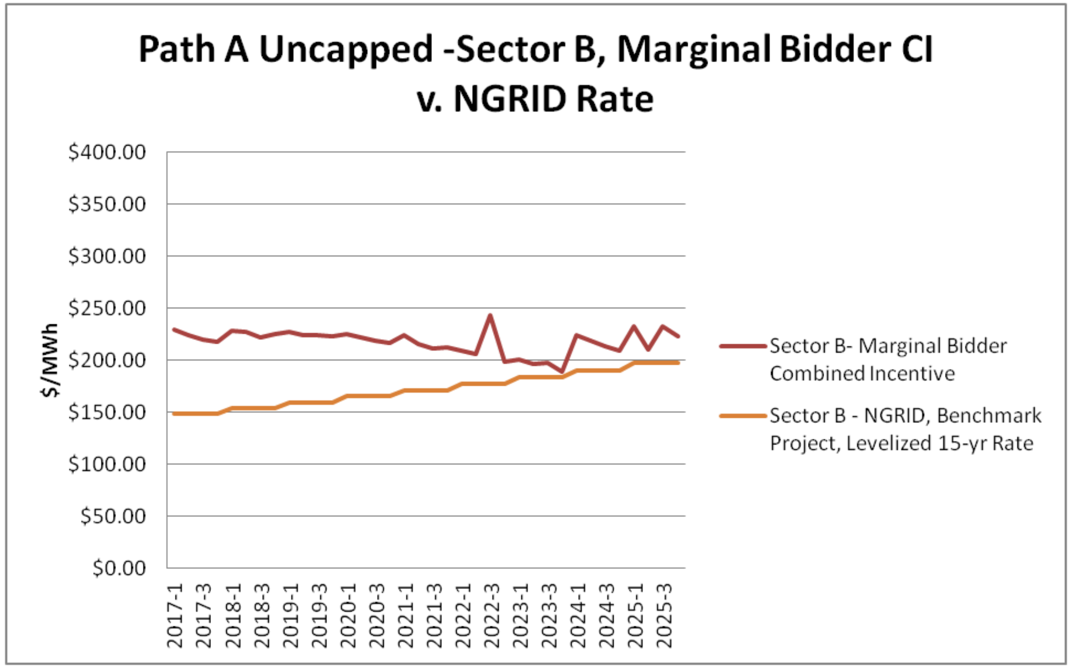
Policy Path A – Large Competitive PBI – Sector B

Spikes reflect supply lumpiness and modeling method.

Capped



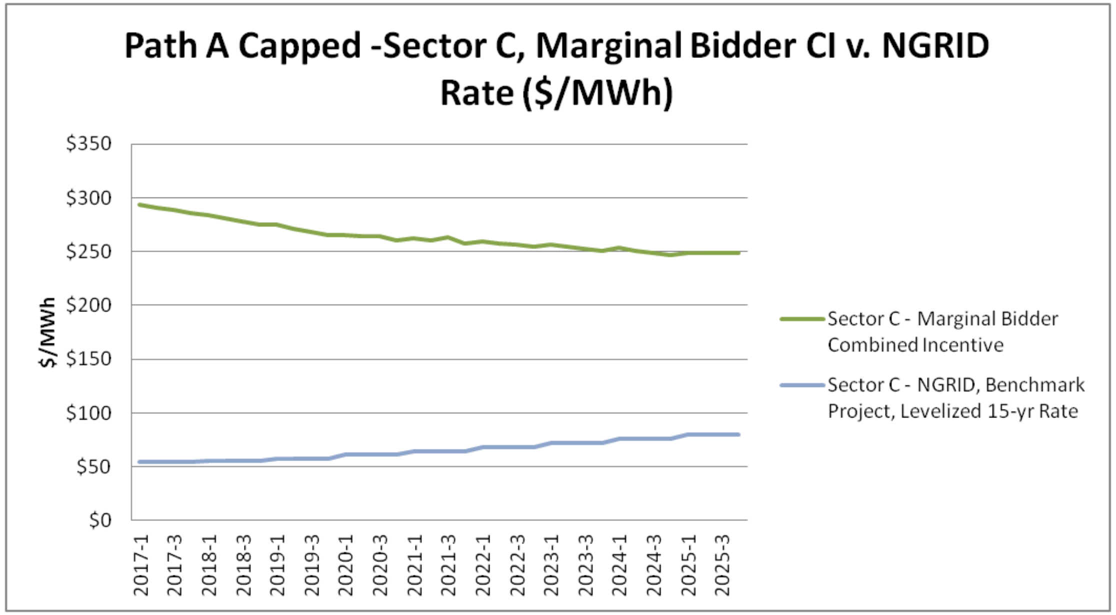
Uncapped



Policy Path A – Large Competitive PBI – Sector C

Higher Marginal Bid is function of modeling constraints, and not likely to be seen in practice. See Note.

Capped



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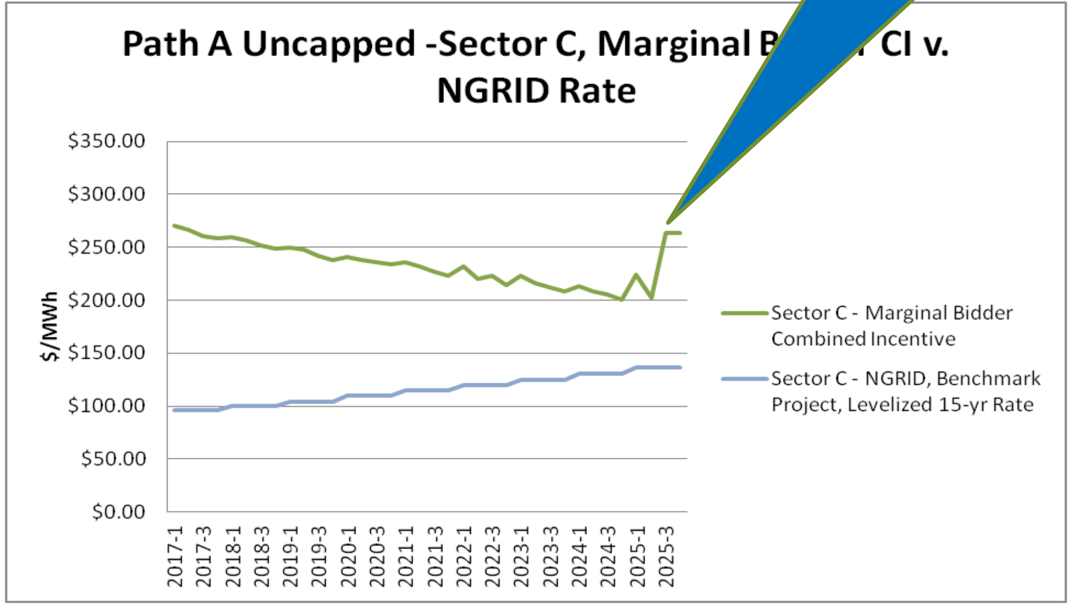
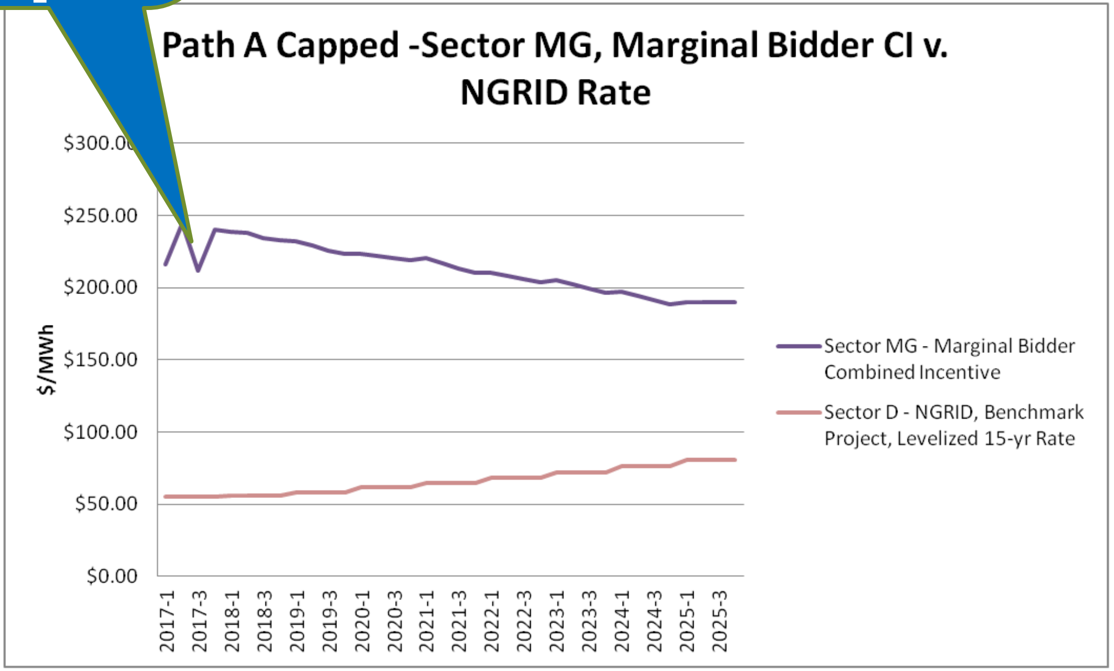


Policy Path A – Large Competitive PBI – Sector D

Spikes are reflective of "Price is Right" Modeling Assumption

Capped



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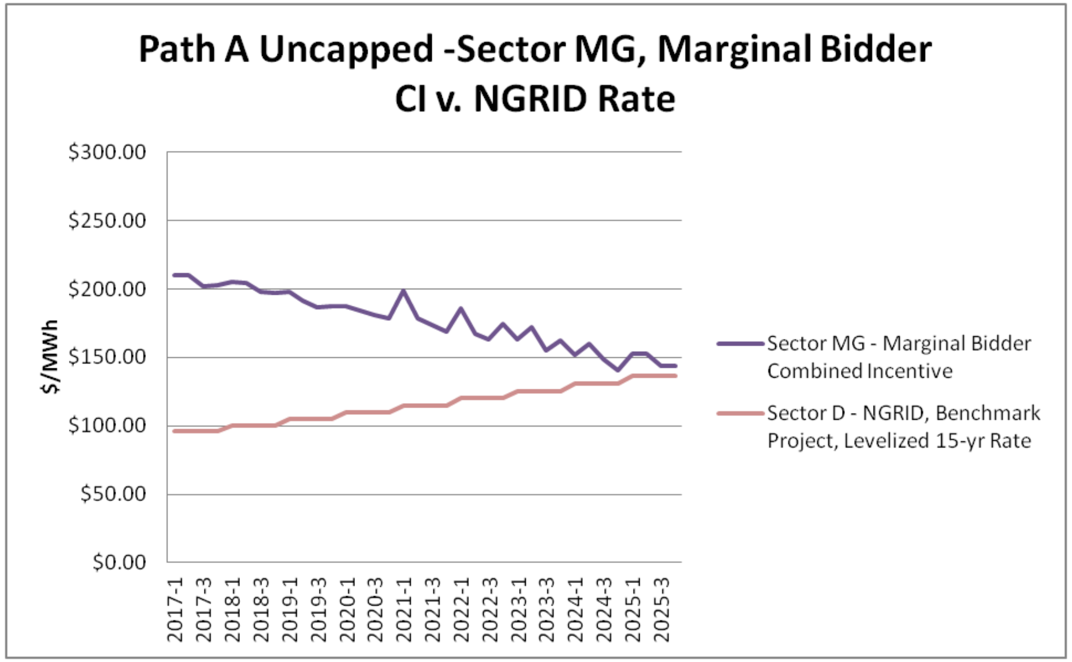
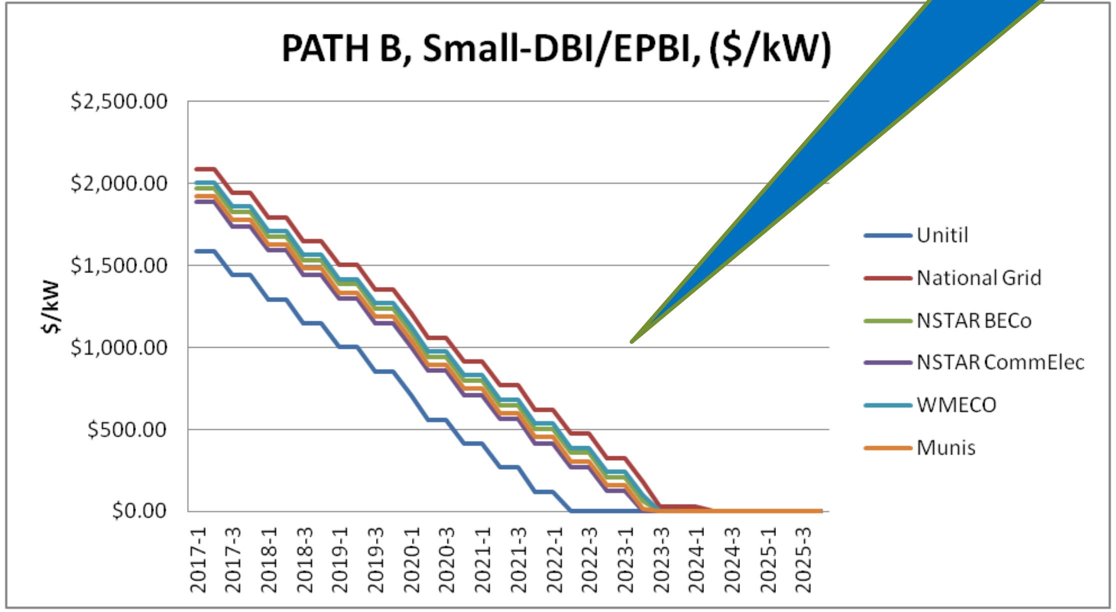


Policy Path B – Small Residential DBI/EPBI

Same for Both NM/ no NM

Capped



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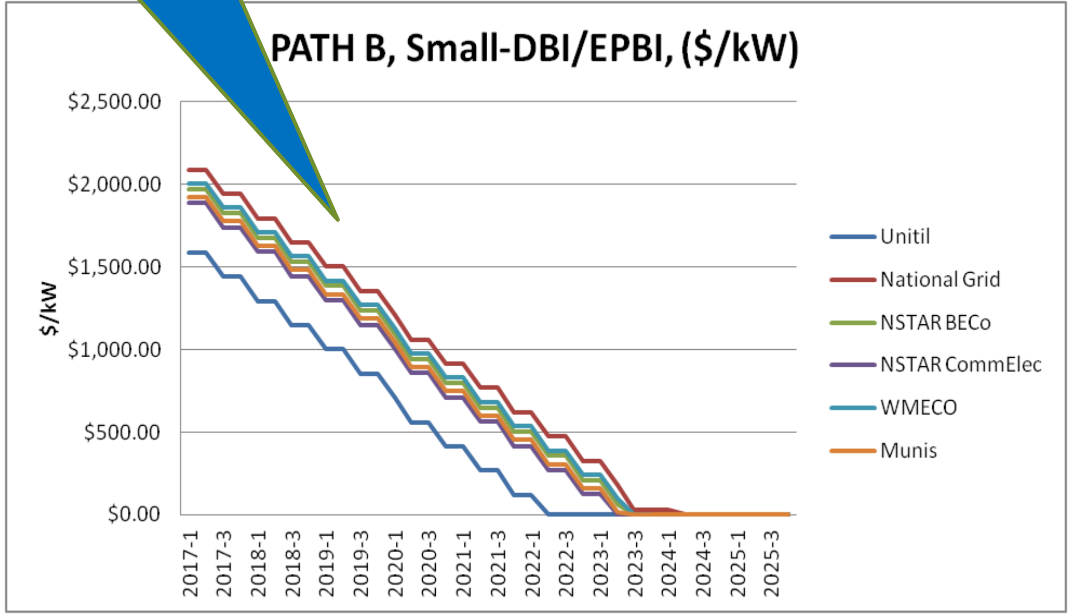
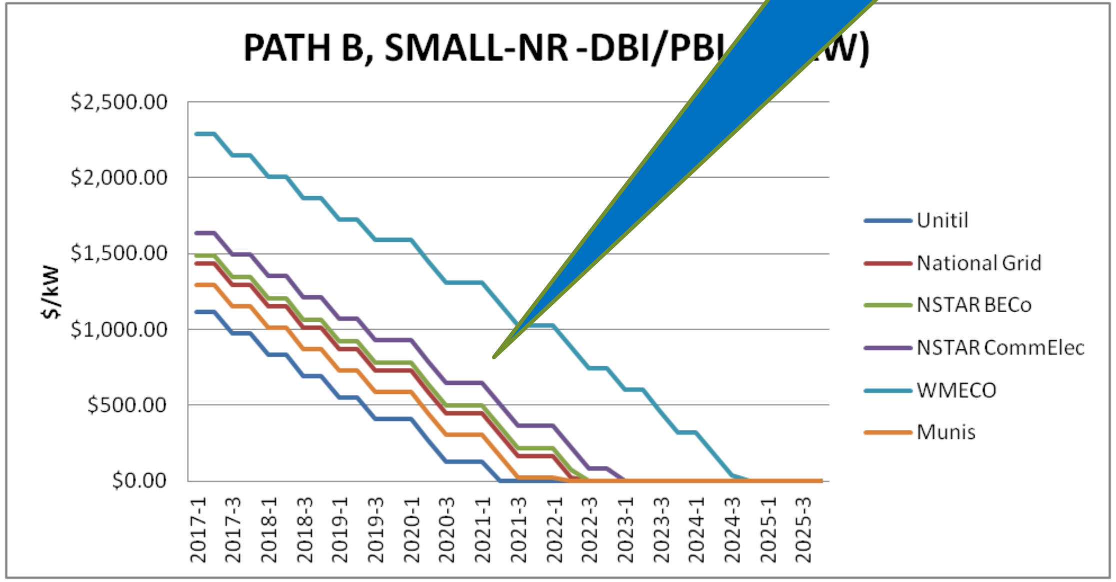


Policy Path B – Small Non-Residential DBI/EPBI

Same for Both NM/ no NM

Capped



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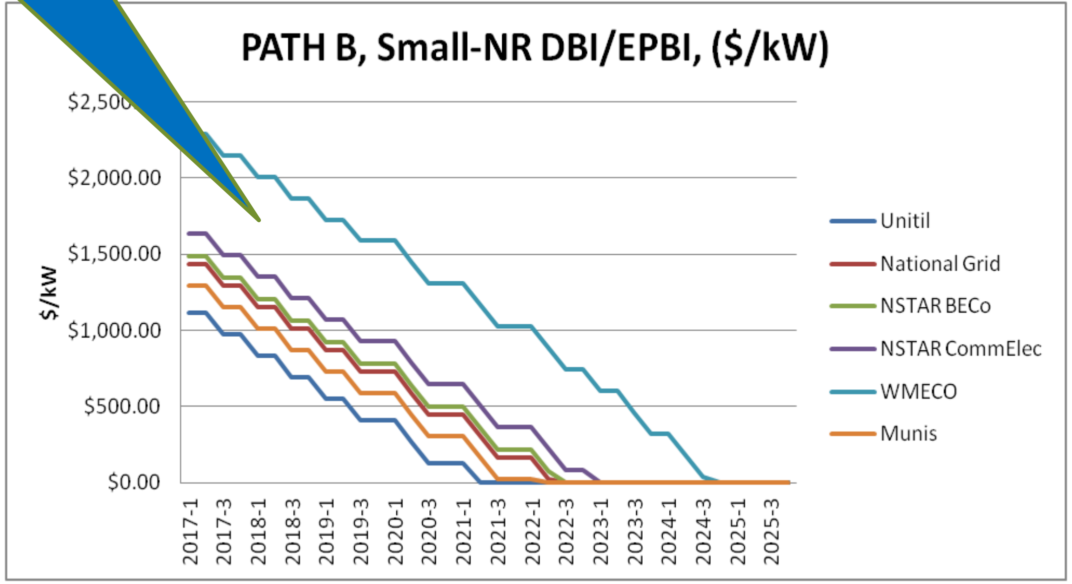
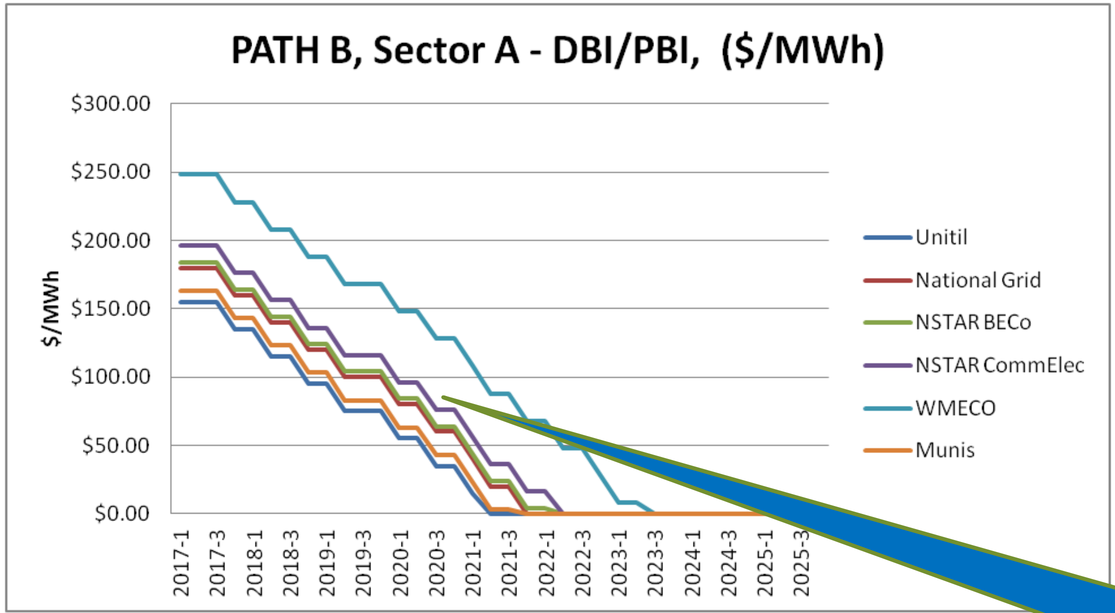


Policy Path B – Sector A DBI/PBI

By 2019, CSS and VNM LIH are no longer dependent on PBI at current NM levels

Capped



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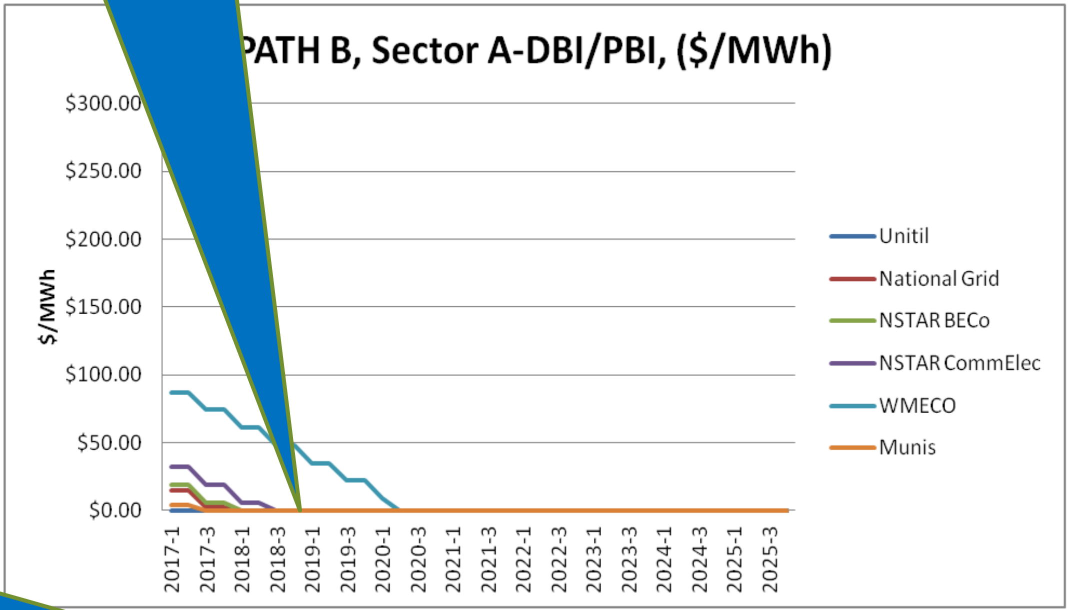
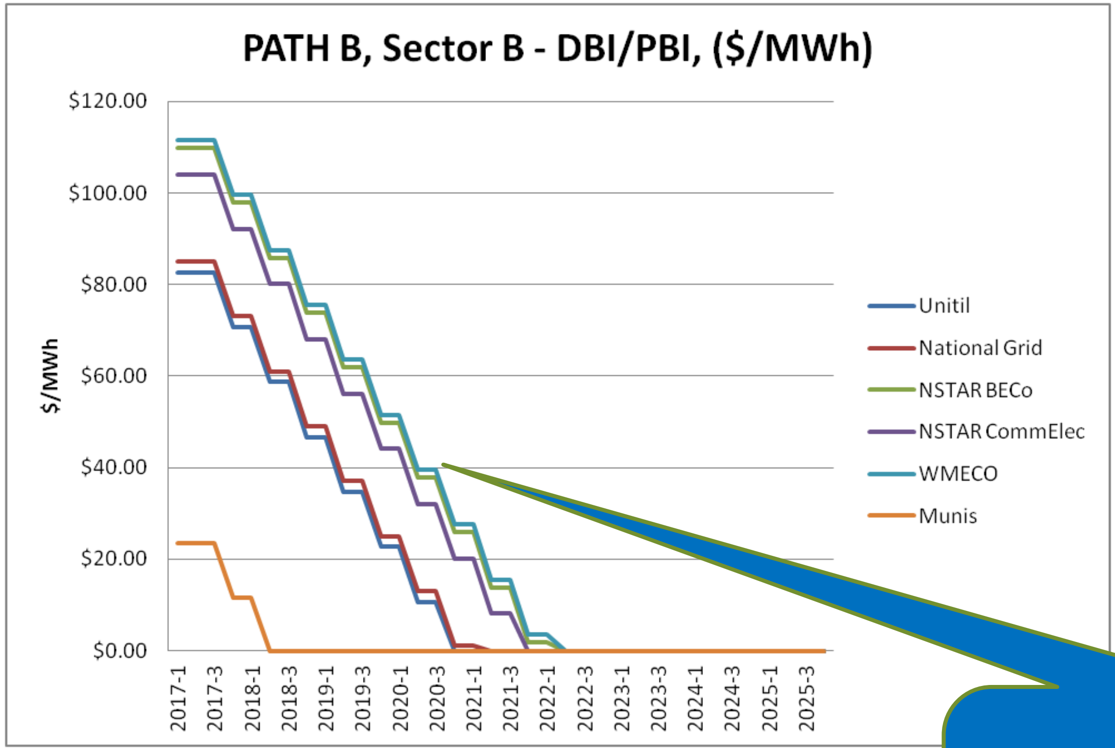


Comparative PBI levels must be viewed in context of lowered target (25%-10%)

Policy Path B – Sector B DBI/PBI

Capped



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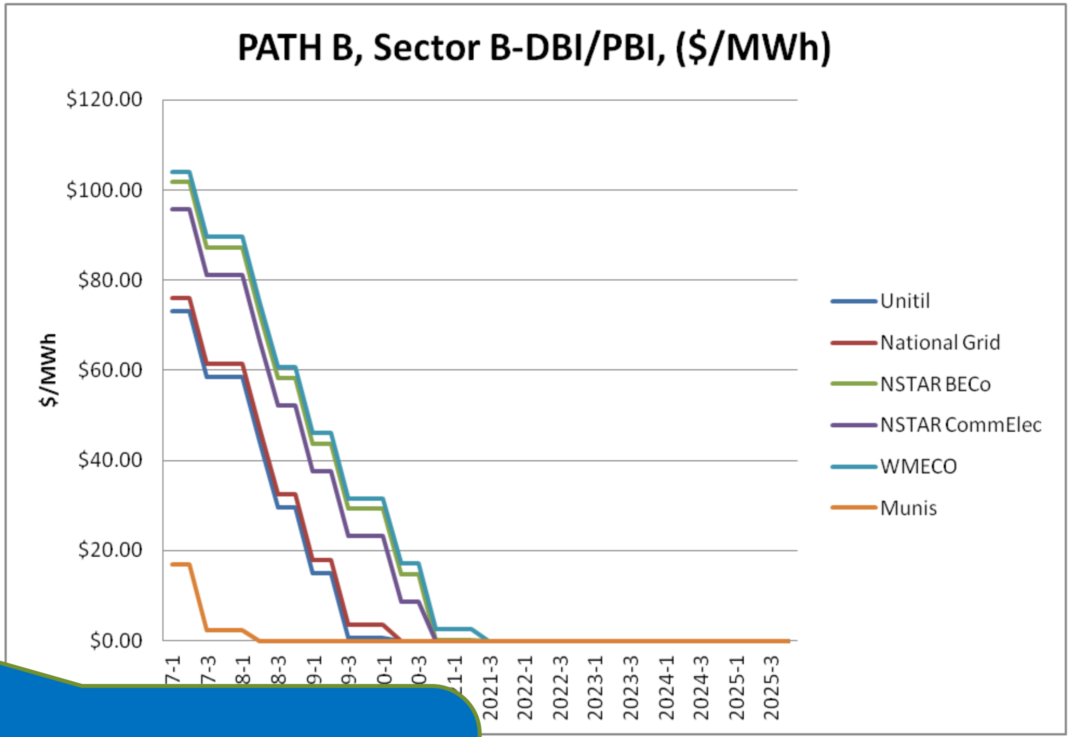
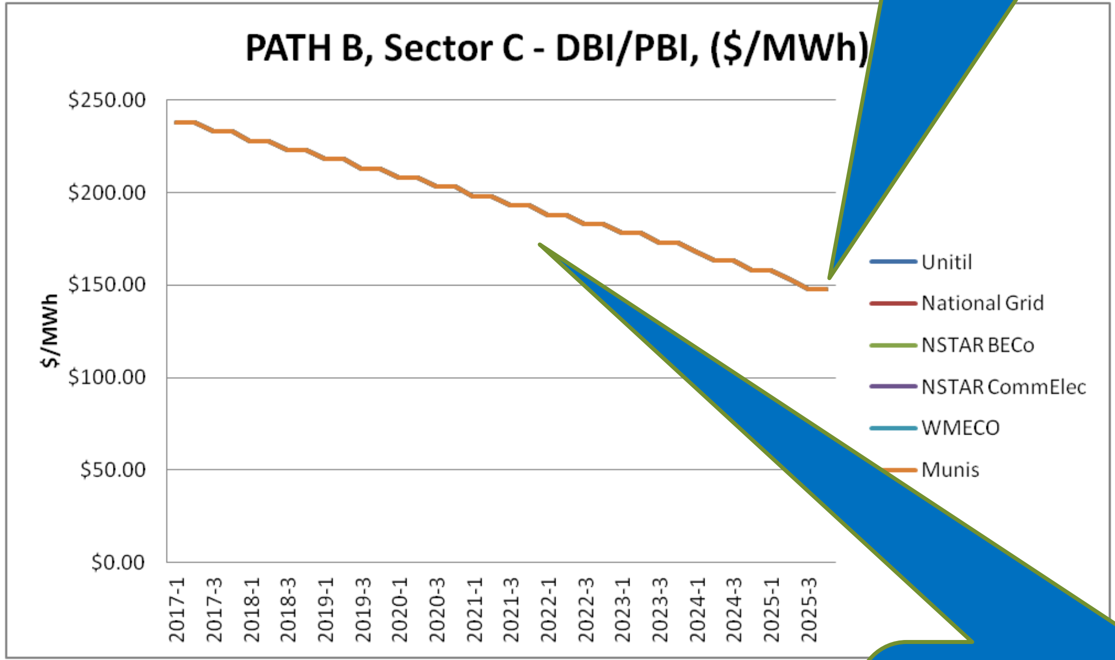


Comparative PBI levels must be viewed in context of raised target (25%-30%)

Policy Path B – Sector C DBI/PBI

Without NM retail rate is QF wholesale rate which is assumed equal across utility territories

Capped



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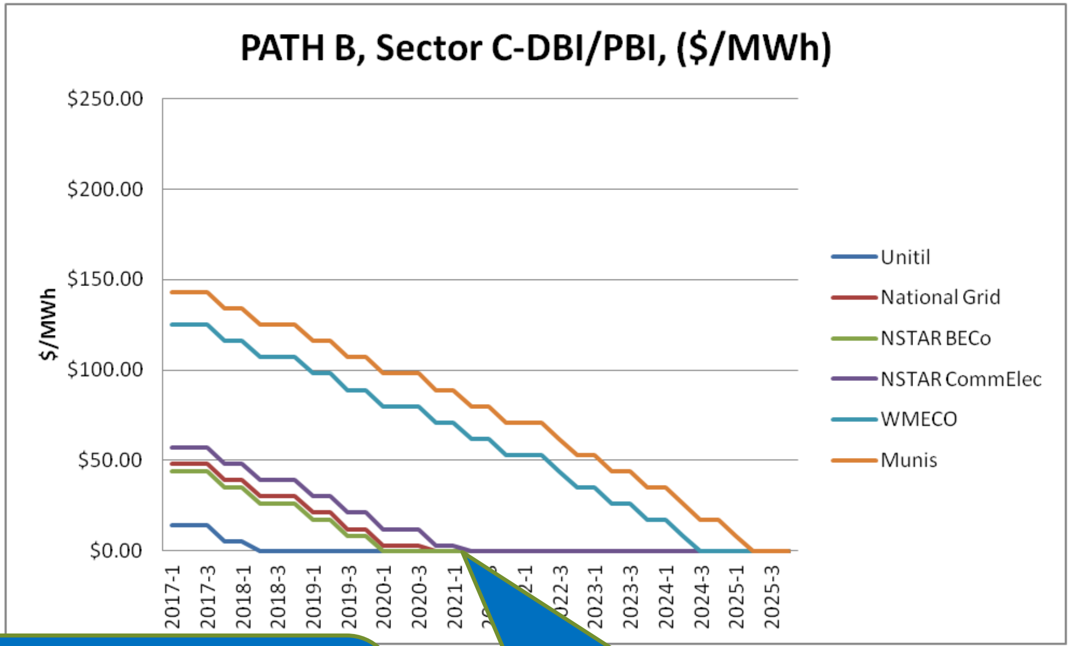


Comparative PBI levels must be viewed in context of raised target (25%-30%)

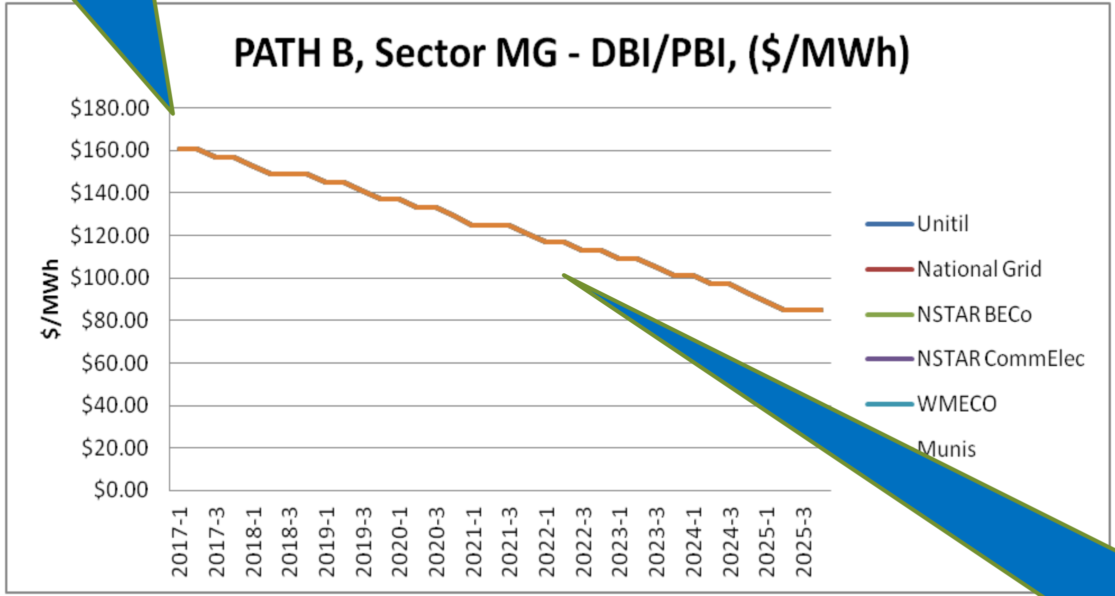
Most growth post-2020 is NM rate driven; signals no need for PBI after 2021

Policy Path B – Sector MG DBI/PBI

Without NM retail rate is QF wholesale rate which is assumed equal across utility territories

Most growth post 2021 is NM Rate Driven

Capped



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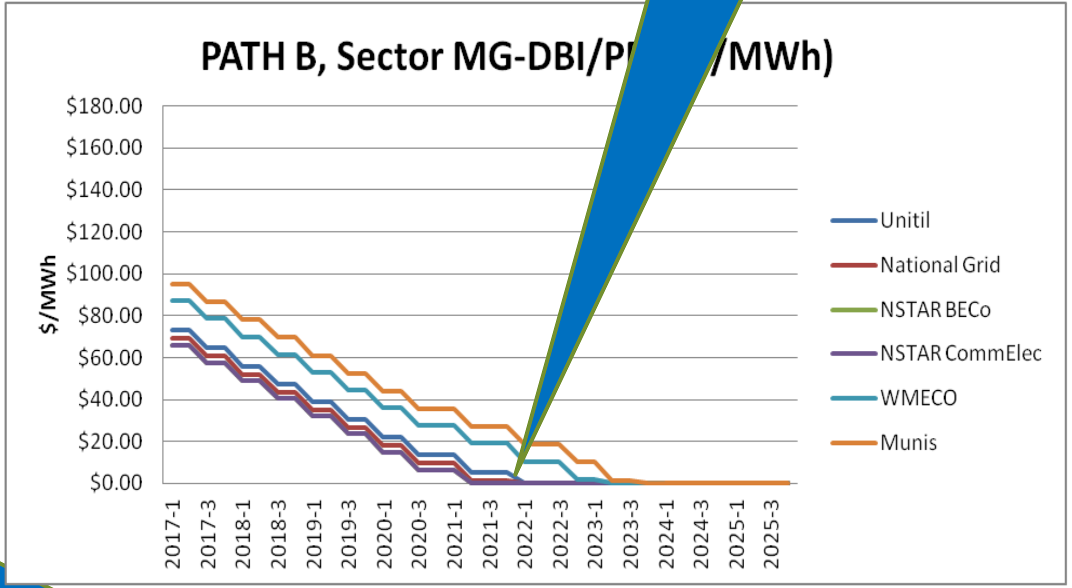


Comparative PBI levels must be viewed in context of raised target (25%-30%)

COST & BENEFIT RESULTS

DETAILED CB STACKS

NOP Costs and Benefits – SREC Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
Lease Payments	CB1.3	$ 228.2	$ 3.3	$ 209.0	$ 4.8
PILOTs / Property Taxes	CB1.4	$ 152.6	$ 2.2	$ 148.1	$ 3.4
Generation Value of On-site Generation	CB3.1	$ 155.3	$ 2.3	$ 104.1	$ 2.4
Transmission Value of On-site Generation	CB3.2	$ 25.4	$ 0.4	$ 17.5	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 63.5	$ 0.9	$ 42.5	$ 1.0
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 9.6	$ 0.1	$ 7.2	$ 0.2
Offsetting On-site Usage	CB4.1	$ 16.4	$ 0.2	$ 10.6	$ 0.2
Virtual NM	CB4.2	$ 476.0	$ 6.9	$ 476.0	$ 10.9
Total		**$ 1,127.1**	**$ 16.4**	**$ 1,015.0**	**$ 23.3**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 59.2	$ 0.9	$ 52.3	$ 1.2
Federal Income Taxes	CB1.7b	$ 258.8	$ 3.8	$ 228.7	$ 5.2
Total		**$ 318.0**	**$ 4.6**	**$ 280.9**	**$ 6.4**

NOP Costs and Benefits – SREC Uncapped

Benefits

		1600 MW	
C/B Component ↓	CB Code	NPV Benefits (Million $)	NPV $/MWh Benefits
Lease Payments	CB1.3	$ 223.4	$ 5.1
PILOTs / Property Taxes	CB1.4	$ 160.7	$ 3.7
Generation Value of On-site Generation	CB3.1	$ 94.1	$ 2.2
Transmission Value of On-site Generation	CB3.2	$ 15.7	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 37.9	$ 0.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 6.6	$ 0.2
Offsetting On-site Usage	CB4.1	$ 9.1	$ 0.2
Virtual NM	CB4.2	$ 525.0	$ 12.1
Total		**$ 1,072.5**	**$ 24.6**

Costs

		1600 MW	
C/B Component ↓	CB Code	NPV Costs (Million $)	NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 53.0	$ 1.2
Federal Income Taxes	CB1.7b	$ 231.9	$ 5.3
Total		**$ 284.9**	**$ 6.5**

NOP Costs and Benefits – Policy A Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
Lease Payments	CB1.3	$ 304.3	$ 4.3	$ 222.7	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 156.8	$ 3.5
Generation Value of On-site Generation	CB3.1	$ 167.8	$ 2.4	$ 104.8	$ 2.3
Transmission Value of On-site Generation	CB3.2	$ 24.9	$ 0.4	$ 17.3	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 63.9	$ 0.9	$ 42.3	$ 0.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 10.8	$ 0.2	$ 7.3	$ 0.2
Offsetting On-site Usage	CB4.1	$ 10.2	$ 0.1	$ 9.0	$ 0.2
Virtual NM	CB4.2	$ 453.1	$ 6.4	$ 453.1	$ 10.1
Total		**$ 1,239.3**	**$ 17.6**	**$ 1,013.3**	**$ 22.7**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 63.3	$ 0.9	$ 51.9	$ 1.2
Federal Income Taxes	CB1.7b	$ 277.0	$ 3.9	$ 227.1	$ 5.1
Total		**$ 340.4**	**$ 4.8**	**$ 279.0**	**$ 6.2**

NOP Costs and Benefits – Policy A Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
Lease Payments	CB1.3	$ 203.8	$ 2.9	$ 198.1	$ 4.4
PILOTs / Property Taxes	CB1.4	$ 146.8	$ 2.1	$ 142.9	$ 3.2
Generation Value of On-site Generation	CB3.1	$ 134.7	$ 1.9	$ 97.4	$ 2.2
Transmission Value of On-site Generation	CB3.2	$ 19.8	$ 0.3	$ 16.2	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 48.0	$ 0.7	$ 39.3	$ 0.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 9.1	$ 0.1	$ 6.8	$ 0.2
Offsetting On-site Usage	CB4.1	$ 11.9	$ 0.2	$ 9.3	$ 0.2
Virtual NM	CB4.2	$ 659.1	$ 9.4	$ 497.8	$ 11.1
Total		**$ 1,233.2**	**$ 17.5**	**$ 1,008.0**	**$ 22.6**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 36.6	$ 0.5	$ 49.0	$ 1.1
Federal Income Taxes	CB1.7b	$ 160.2	$ 2.3	$ 214.2	$ 4.8
Total		**$ 196.8**	**$ 2.8**	**$ 263.2**	**$ 5.9**

NOP Costs and Benefits – Policy B Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
Lease Payments	CB1.3	$ 299.1	$ 4.2	$ 222.4	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 157.5	$ 3.5
Generation Value of On-site Generation	CB3.1	$ 160.1	$ 2.3	$ 102.2	$ 2.3
Transmission Value of On-site Generation	CB3.2	$ 25.9	$ 0.4	$ 17.0	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 66.6	$ 0.9	$ 41.9	$ 0.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 10.3	$ 0.1	$ 7.1	$ 0.2
Offsetting On-site Usage	CB4.1	$ 11.8	$ 0.2	$ 9.2	$ 0.2
Virtual NM	CB4.2	$ 453.1	$ 6.4	$ 453.1	$ 10.1
Total		**$ 1,231.0**	**$ 17.5**	**$ 1,010.3**	**$ 22.6**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 62.8	$ 0.9	$ 51.7	$ 1.2
Federal Income Taxes	CB1.7b	$ 274.7	$ 3.9	$ 226.0	$ 5.1
Total		**$ 337.5**	**$ 4.8**	**$ 277.7**	**$ 6.2**

NOP Costs and Benefits – Policy B Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
Lease Payments	CB1.3	$ 299.1	$ 4.3	$ 222.0	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 213.2	$ 3.0	$ 159.5	$ 3.6
Generation Value of On-site Generation	CB3.1	$ 132.3	$ 1.9	$ 97.1	$ 2.2
Transmission Value of On-site Generation	CB3.2	$ 21.6	$ 0.3	$ 16.1	$ 0.4
Distribution Value of On-site Generation	CB3.3	$ 52.3	$ 0.7	$ 39.2	$ 0.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 8.8	$ 0.1	$ 6.8	$ 0.2
Offsetting On-site Usage	CB4.1	$ 13.7	$ 0.2	$ 9.6	$ 0.2
Virtual NM	CB4.2	$ 775.5	$ 11.0	$ 520.4	$ 11.7
Total		**$ 1,516.6**	**$ 21.6**	**$ 1,070.8**	**$ 24.0**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Income Taxes	CB1.6.b	$ 45.7	$ 0.7	$ 53.0	$ 1.2
Federal Income Taxes	CB1.7b	$ 199.9	$ 2.8	$ 232.0	$ 5.2
Total		**$ 245.7**	**$ 3.5**	**$ 285.0**	**$ 6.4**

CG Costs and Benefits – SREC Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 134.0	$ 1.9	$ 56.7	$ 1.3
Federal Incentives (ITC)	CB1.7a	$ 1,304.8	$ 18.9	$ 1,258.7	$ 28.9
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,373.7	$ 63.5	$ 3,565.2	$ 81.8
Generation Value of On-site Generation	CB3.1	$ 2,263.9	$ 32.9	$ 940.0	$ 21.6
Transmission Value of On-site Generation	CB3.2	$ 376.3	$ 5.5	$ 163.9	$ 3.8
Distribution Value of On-site Generation	CB3.3	$ 1,010.5	$ 14.7	$ 404.4	$ 9.3
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 129.6	$ 1.9	$ 62.7	$ 1.4
Offsetting On-site Usage	CB4.1	$ 323.0	$ 4.7	$ 130.9	$ 3.0
Virtual NM	CB4.2	$ 2,563.0	$ 37.2	$ 2,563.0	$ 58.8
Wholesale Market Sales	CB4.3	$ 69.0	$ 1.0	$ 48.4	$ 1.1
Avoided Generation Capacity Costs	CB5.3	$ 120.1	$ 1.7	$ 77.8	$ 1.8
Total		**$ 12,668.0**	**$ 183.9**	**$ 9,271.7**	**$ 212.8**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 6,696.8	$ 97.2	$ 5,183.0	$ 118.9
Ongoing O&M + Insurance Costs	CB1.2	$ 1,382.7	$ 20.1	$ 980.3	$ 22.5
Lease Payments	CB1.3	$ 228.2	$ 3.3	$ 209.0	$ 4.8
PILOTs / Property Taxes	CB1.4	$ 152.6	$ 2.2	$ 148.1	$ 3.4
MA Income Taxes	CB1.6.b	$ 87.7	$ 1.3	$ 97.8	$ 2.2
Federal Income Taxes	CB1.7b	$ 383.7	$ 5.6	$ 427.9	$ 9.8
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -	$ -	$ -
Total		**$ 8,931.6**	**$ 129.7**	**$ 7,046.2**	**$ 161.7**

CG Costs and Benefits – SREC Uncapped

Benefits

C/B Component ↓	CB Code	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 42.4	$ 1.0
Federal Incentives (ITC)	CB1.7a	$ 1,258.1	$ 28.9
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,526.7	$ 81.0
Generation Value of On-site Generation	CB3.1	$ 766.0	$ 17.6
Transmission Value of On-site Generation	CB3.2	$ 130.9	$ 3.0
Distribution Value of On-site Generation	CB3.3	$ 320.6	$ 7.4
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 51.3	$ 1.2
Offsetting On-site Usage	CB4.1	$ 103.1	$ 2.4
Virtual NM	CB4.2	$ 2,891.5	$ 66.4
Wholesale Market Sales	CB4.3	$ -	$ -
Avoided Generation Capacity Costs	CB5.3	$ 77.9	$ 1.8
Total		**$ 9,168.5**	**$ 210.6**

Costs

C/B Component ↓	CB Code	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 5,136.5	$ 118.0
Ongoing O&M + Insurance Costs	CB1.2	$ 986.7	$ 22.7
Lease Payments	CB1.3	$ 223.4	$ 5.1
PILOTs / Property Taxes	CB1.4	$ 160.7	$ 3.7
MA Income Taxes	CB1.6.b	$ 23.0	$ 0.5
Federal Income Taxes	CB1.7b	$ 100.8	$ 2.3
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -
Total		**$ 6,631.2**	**$ 152.3**

CG Costs and Benefits – Policy A Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 59.8	$ 0.8	$ 43.8	$ 1.0
Federal Incentives (ITC)	CB1.7a	$ 1,335.4	$ 19.0	$ 1,251.3	$ 28.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,342.9	$ 61.7	$ 3,592.3	$ 80.4
Generation Value of On-site Generation	CB3.1	$ 1,462.9	$ 20.8	$ 836.4	$ 18.7
Transmission Value of On-site Generation	CB3.2	$ 213.3	$ 3.0	$ 138.6	$ 3.1
Distribution Value of On-site Generation	CB3.3	$ 551.3	$ 7.8	$ 343.0	$ 7.7
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 90.3	$ 1.3	$ 55.9	$ 1.3
Offsetting On-site Usage	CB4.1	$ 114.2	$ 1.6	$ 94.9	$ 2.1
Virtual NM	CB4.2	$ 2,409.7	$ 34.2	$ 2,409.7	$ 53.9
Wholesale Market Sales	CB4.3	$ 841.1	$ 11.9	$ 226.7	$ 5.1
Avoided Generation Capacity Costs	CB5.3	$ 119.0	$ 1.7	$ 77.8	$ 1.7
Total		**$ 11,540.0**	**$ 163.8**	**$ 9,070.2**	**$ 202.9**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 6,267.7	$ 89.0	$ 5,094.3	$ 114.0
Ongoing O&M + Insurance Costs	CB1.2	$ 1,270.7	$ 18.0	$ 949.5	$ 21.2
Lease Payments	CB1.3	$ 304.3	$ 4.3	$ 222.7	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 156.8	$ 3.5
MA Income Taxes	CB1.6.b	$ 222.2	$ 3.2	$ 123.1	$ 2.8
Federal Income Taxes	CB1.7b	$ 972.0	$ 13.8	$ 538.5	$ 12.0
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 71.2	$ 1.0	$ 17.9	$ 0.4
Total		**$ 9,312.3**	**$ 132.2**	**$ 7,102.7**	**$ 158.9**

CG Costs and Benefits – Policy A Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 58.8	$ 0.8	$ 43.2	$ 1.0
Federal Incentives (ITC)	CB1.7a	$ 1,337.1	$ 19.0	$ 1,256.4	$ 28.1
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,830.3	$ 54.5	$ 3,446.4	$ 77.2
Generation Value of On-site Generation	CB3.1	$ 1,258.6	$ 17.9	$ 786.3	$ 17.6
Transmission Value of On-site Generation	CB3.2	$ 182.1	$ 2.6	$ 131.8	$ 3.0
Distribution Value of On-site Generation	CB3.3	$ 452.2	$ 6.4	$ 321.1	$ 7.2
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 81.2	$ 1.2	$ 53.2	$ 1.2
Offsetting On-site Usage	CB4.1	$ 133.3	$ 1.9	$ 99.0	$ 2.2
Virtual NM	CB4.2	$ 3,513.1	$ 50.0	$ 2,687.3	$ 60.2
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Avoided Generation Capacity Costs	CB5.3	$ 119.2	$ 1.7	$ 77.8	$ 1.7
Total		**$ 10,966.0**	**$ 156.0**	**$ 8,902.6**	**$ 199.3**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 6,236.8	$ 88.7	$ 5,085.4	$ 113.9
Ongoing O&M + Insurance Costs	CB1.2	$ 879.3	$ 12.5	$ 859.7	$ 19.2
Lease Payments	CB1.3	$ 203.8	$ 2.9	$ 198.1	$ 4.4
PILOTs / Property Taxes	CB1.4	$ 146.8	$ 2.1	$ 142.9	$ 3.2
MA Income Taxes	CB1.6.b	$ 211.0	$ 3.0	$ 85.7	$ 1.9
Federal Income Taxes	CB1.7b	$ 922.9	$ 13.1	$ 375.1	$ 8.4
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 69.9	$ 1.0	$ 16.4	$ 0.4
Total		**$ 8,670.5**	**$ 123.3**	**$ 6,763.3**	**$ 151.4**

CG Costs and Benefits – Policy B Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 60.0	$ 0.9	$ 43.8	$ 1.0
Federal Incentives (ITC)	CB1.7a	$ 1,325.7	$ 18.8	$ 1,248.6	$ 27.9
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,173.2	$ 59.2	$ 3,577.5	$ 80.0
Generation Value of On-site Generation	CB3.1	$ 1,468.3	$ 20.8	$ 827.0	$ 18.5
Transmission Value of On-site Generation	CB3.2	$ 228.2	$ 3.2	$ 138.9	$ 3.1
Distribution Value of On-site Generation	CB3.3	$ 575.3	$ 8.2	$ 344.1	$ 7.7
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 91.2	$ 1.3	$ 55.4	$ 1.2
Offsetting On-site Usage	CB4.1	$ 131.0	$ 1.9	$ 99.5	$ 2.2
Virtual NM	CB4.2	$ 2,409.7	$ 34.2	$ 2,409.7	$ 53.9
Wholesale Market Sales	CB4.3	$ 838.6	$ 11.9	$ 234.9	$ 5.3
Avoided Generation Capacity Costs	CB5.3	$ 119.2	$ 1.7	$ 77.8	$ 1.7
Total		**$ 11,420.4**	**$ 162.1**	**$ 9,057.2**	**$ 202.6**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 6,224.5	$ 88.4	$ 5,086.3	$ 113.8
Ongoing O&M + Insurance Costs	CB1.2	$ 1,315.2	$ 18.7	$ 964.8	$ 21.6
Lease Payments	CB1.3	$ 299.1	$ 4.2	$ 222.4	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 157.5	$ 3.5
MA Income Taxes	CB1.6.b	$ 188.9	$ 2.7	$ 118.0	$ 2.6
Federal Income Taxes	CB1.7b	$ 826.5	$ 11.7	$ 510.3	$ 11.4
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -	$ -	$ -
Total		**$ 9,058.4**	**$ 128.6**	**$ 7,059.2**	**$ 157.9**

CG Costs and Benefits – Policy B Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ -	$ -	$ -	$ -
MA Residential RE Tax Credit	CB1.6.a	$ 59.1	$ 0.8	$ 43.4	$ 1.0
Federal Incentives (ITC)	CB1.7a	$ 1,334.5	$ 19.0	$ 1,255.7	$ 28.1
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,418.6	$ 48.6	$ 3,496.4	$ 78.3
Generation Value of On-site Generation	CB3.1	$ 1,277.5	$ 18.2	$ 788.0	$ 17.6
Transmission Value of On-site Generation	CB3.2	$ 203.9	$ 2.9	$ 132.3	$ 3.0
Distribution Value of On-site Generation	CB3.3	$ 492.0	$ 7.0	$ 323.5	$ 7.2
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 81.3	$ 1.2	$ 53.2	$ 1.2
Offsetting On-site Usage	CB4.1	$ 159.0	$ 2.3	$ 105.2	$ 2.4
Virtual NM	CB4.2	$ 4,197.8	$ 59.7	$ 2,842.0	$ 63.6
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Avoided Generation Capacity Costs	CB5.3	$ 119.3	$ 1.7	$ 77.8	$ 1.7
Total		**$ 11,342.9**	**$ 161.3**	**$ 9,117.4**	**$ 204.2**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
System Installed Costs	CB1.1	$ 6,274.2	$ 89.2	$ 5,095.9	$ 114.1
Ongoing O&M + Insurance Costs	CB1.2	$ 1,365.4	$ 19.4	$ 976.1	$ 21.9
Lease Payments	CB1.3	$ 299.1	$ 4.3	$ 222.0	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 213.2	$ 3.0	$ 159.5	$ 3.6
MA Income Taxes	CB1.6.b	$ 236.6	$ 3.4	$ 91.9	$ 2.1
Federal Income Taxes	CB1.7b	$ 1,035.3	$ 14.7	$ 402.0	$ 9.0
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -	$ -	$ -
Total		**$ 9,423.8**	**$ 134.0**	**$ 6,947.4**	**$ 155.6**

NPR Costs and Benefits – SREC Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 146.9	$ 2.1	$ 150.1	$ 3.4
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,471.6	$ 21.4	$ 921.8	$ 21.2
Generation Value of On-site Generation	CB3.1	$ 135.1	$ 2.0	$ 58.3	$ 1.3
Wholesale Market Sales	CB4.3	$ 3.9	$ 0.1	$ 2.7	$ 0.1
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.5
Avoided Generation Capacity Costs	CB5.3	$ 2,064.4	$ 30.0	$ 1,551.2	$ 35.6
Avoided Transmission Tariff Charges	CB5.5	$ 167.0	$ 2.4	$ 148.4	$ 3.4
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.6
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.3	$ 660.0	$ 15.1
Total		**$ 4,935.7**	**$ 71.7**	**$ 3,669.3**	**$ 84.2**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 134.0	$ 1.9	$ 56.7	$ 1.3
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,884.4	$ 70.9	$ 3,871.4	$ 88.8
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 200.0	$ 2.9	$ 175.7	$ 4.0
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -	$ -	$ -
Transmission Value of On-site Generation	CB3.2	$ 401.7	$ 5.8	$ 181.4	$ 4.2
Distribution Value of On-site Generation	CB3.3	$ 1,074.0	$ 15.6	$ 446.9	$ 10.3
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 125.1	$ 1.8	$ 63.1	$ 1.4
Offsetting On-site Usage	CB4.1	$ 182.4	$ 2.6	$ 78.6	$ 1.8
Virtual NM	CB4.2	$ 1,756.2	$ 25.5	$ 1,751.3	$ 40.2
Total		**$ 8,757.8**	**$ 127.1**	**$ 6,625.1**	**$ 152.0**

NPR Costs and Benefits – SREC Uncapped

Benefits

C/B Component ↓	CB Code	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 76.1	$ 1.7
Displaced RPS Class I Compliance Costs	CB2.3	$ 893.5	$ 20.5
Generation Value of On-site Generation	CB3.1	$ 48.0	$ 1.1
Wholesale Market Sales	CB4.3	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 64.4	$ 1.5
Avoided Generation Capacity Costs	CB5.3	$ 1,549.3	$ 35.6
Avoided Transmission Tariff Charges	CB5.5	$ 148.2	$ 3.4
Avoided Trans. Investment - Remote Wind	CB6.1	$ 112.5	$ 2.6
Avoided Environmental Impacts	CB7.1	$ 660.0	$ 15.2
Total		**$ 3,551.9**	**$ 81.6**

Costs

C/B Component ↓	CB Code	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 42.4	$ 1.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,812.7	$ 87.6
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 167.1	$ 3.8
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -
Transmission Value of On-site Generation	CB3.2	$ 146.6	$ 3.4
Distribution Value of On-site Generation	CB3.3	$ 358.6	$ 8.2
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 52.2	$ 1.2
Offsetting On-site Usage	CB4.1	$ 60.3	$ 1.4
Virtual NM	CB4.2	$ 1,920.0	$ 44.1
Total		**$ 6,559.9**	**$ 150.7**

NPR Costs and Benefits – Policy A Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 285.5	$ 4.1	$ 175.0	$ 3.9
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,552.6	$ 22.0	$ 961.4	$ 21.5
Generation Value of On-site Generation	CB3.1	$ 91.1	$ 1.3	$ 52.6	$ 1.2
Wholesale Market Sales	CB4.3	$ 47.0	$ 0.7	$ 12.7	$ 0.3
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,103.3	$ 29.9	$ 1,552.6	$ 34.7
Avoided Transmission Tariff Charges	CB5.5	$ 172.6	$ 2.4	$ 148.4	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 5,199.0**	**$ 73.8**	**$ 3,739.5**	**$ 83.7**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 59.8	$ 0.8	$ 43.8	$ 1.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,589.4	$ 65.2	$ 3,838.8	$ 85.9
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 191.1	$ 2.7	$ 191.1	$ 4.3
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 197.4	$ 2.8	$ 63.5	$ 1.4
Transmission Value of On-site Generation	CB3.2	$ 238.2	$ 3.4	$ 155.9	$ 3.5
Distribution Value of On-site Generation	CB3.3	$ 615.2	$ 8.7	$ 385.3	$ 8.6
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 91.0	$ 1.3	$ 56.9	$ 1.3
Offsetting On-site Usage	CB4.1	$ 52.7	$ 0.7	$ 52.6	$ 1.2
Virtual NM	CB4.2	$ 1,668.0	$ 23.7	$ 1,663.5	$ 37.2
Total		**$ 7,702.9**	**$ 109.4**	**$ 6,451.3**	**$ 144.3**

NPR Costs and Benefits – Policy A Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 247.6	$ 3.5	$ 134.7	$ 3.0
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,515.0	$ 21.5	$ 949.6	$ 21.3
Generation Value of On-site Generation	CB3.1	$ 77.8	$ 1.1	$ 49.4	$ 1.1
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,101.6	$ 29.9	$ 1,551.2	$ 34.7
Avoided Transmission Tariff Charges	CB5.5	$ 172.3	$ 2.5	$ 148.2	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 5,061.2**	**$ 72.0**	**$ 3,669.9**	**$ 82.2**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 58.8	$ 0.8	$ 43.2	$ 1.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,080.3	$ 58.0	$ 3,696.4	$ 82.8
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 191.7	$ 2.7	$ 191.7	$ 4.3
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 108.1	$ 1.5	$ 61.8	$ 1.4
Transmission Value of On-site Generation	CB3.2	$ 201.9	$ 2.9	$ 148.0	$ 3.3
Distribution Value of On-site Generation	CB3.3	$ 500.3	$ 7.1	$ 360.4	$ 8.1
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 81.3	$ 1.2	$ 54.1	$ 1.2
Offsetting On-site Usage	CB4.1	$ 52.9	$ 0.8	$ 52.7	$ 1.2
Virtual NM	CB4.2	$ 1,652.6	$ 23.5	$ 1,648.1	$ 36.9
Total		**$ 6,927.9**	**$ 98.5**	**$ 6,256.5**	**$ 140.1**

NPR Costs and Benefits – Policy B Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 251.7	$ 3.6	$ 169.7	$ 3.8
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,555.7	$ 22.1	$ 960.7	$ 21.5
Generation Value of On-site Generation	CB3.1	$ 90.9	$ 1.3	$ 51.9	$ 1.2
Wholesale Market Sales	CB4.3	$ 46.8	$ 0.7	$ 13.1	$ 0.3
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,100.5	$ 29.8	$ 1,552.8	$ 34.7
Avoided Transmission Tariff Charges	CB5.5	$ 172.2	$ 2.4	$ 148.6	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 5,164.9**	**$ 73.3**	**$ 3,733.7**	**$ 83.5**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 60.0	$ 0.9	$ 43.8	$ 1.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,419.7	$ 62.7	$ 3,824.0	$ 85.5
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 191.1	$ 2.7	$ 191.1	$ 4.3
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 85.3	$ 1.2	$ 30.3	$ 0.7
Transmission Value of On-site Generation	CB3.2	$ 254.0	$ 3.6	$ 156.0	$ 3.5
Distribution Value of On-site Generation	CB3.3	$ 641.9	$ 9.1	$ 386.0	$ 8.6
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 91.6	$ 1.3	$ 56.2	$ 1.3
Offsetting On-site Usage	CB4.1	$ 76.9	$ 1.1	$ 58.8	$ 1.3
Virtual NM	CB4.2	$ 1,668.0	$ 23.7	$ 1,663.5	$ 37.2
Total		**$ 7,488.5**	**$ 106.3**	**$ 6,409.7**	**$ 143.4**

NPR Costs and Benefits – Policy B Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
MA Income Taxes	CB1.6.b	$ 282.3	$ 4.0	$ 144.9	$ 3.2
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,520.2	$ 21.6	$ 950.2	$ 21.3
Generation Value of On-site Generation	CB3.1	$ 78.7	$ 1.1	$ 49.4	$ 1.1
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,100.7	$ 29.9	$ 1,551.3	$ 34.7
Avoided Transmission Tariff Charges	CB5.5	$ 172.2	$ 2.4	$ 148.3	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 5,101.2**	**$ 72.6**	**$ 3,681.1**	**$ 82.4**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
MA Residential RE Tax Credit	CB1.6.a	$ 59.1	$ 0.8	$ 43.4	$ 1.0
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,668.6	$ 52.2	$ 3,599.4	$ 80.6
Other Solar Policy Compliance Costs (e.g. SACP)	CB2.2	$ 191.7	$ 2.7	$ 191.7	$ 4.3
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 85.1	$ 1.2	$ 30.2	$ 0.7
Transmission Value of On-site Generation	CB3.2	$ 225.6	$ 3.2	$ 148.4	$ 3.3
Distribution Value of On-site Generation	CB3.3	$ 544.3	$ 7.7	$ 362.7	$ 8.1
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 81.5	$ 1.2	$ 54.0	$ 1.2
Offsetting On-site Usage	CB4.1	$ 90.0	$ 1.3	$ 61.4	$ 1.4
Virtual NM	CB4.2	$ 2,742.0	$ 39.0	$ 1,885.7	$ 42.2
Total		**$ 7,687.9**	**$ 109.3**	**$ 6,376.9**	**$ 142.8**

C@L Costs and Benefits – SREC Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,812.6	$ 40.8	$ 2,176.9	$ 50.0
Ongoing O&M + Insurance Costs	CB1.2	$ 884.9	$ 12.8	$ 627.4	$ 14.4
Lease Payments	CB1.3	$ 228.2	$ 3.3	$ 209.0	$ 4.8
PILOTs / Property Taxes	CB1.4	$ 152.6	$ 2.2	$ 148.1	$ 3.4
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 1,120.9	$ 16.3	$ 667.7	$ 15.3
Federal Incentives (ITC)	CB1.7a	$ 195.7	$ 2.8	$ 188.8	$ 4.3
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,471.6	$ 21.4	$ 921.8	$ 21.2
Generation Value of On-site Generation	CB3.1	$ 2,554.3	$ 37.1	$ 1,102.4	$ 25.3
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 14.2	$ 0.2	$ 6.8	$ 0.2
Offsetting On-site Usage	CB4.1	$ 157.0	$ 2.3	$ 62.9	$ 1.4
Virtual NM	CB4.2	$ 1,282.7	$ 18.6	$ 1,287.7	$ 29.6
Wholesale Market Sales	CB4.3	$ 72.9	$ 1.1	$ 51.1	$ 1.2
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.5
Avoided Generation Capacity Costs	CB5.3	$ 2,184.5	$ 31.7	$ 1,629.0	$ 37.4
Avoided Transmission Tariff Charges	CB5.5	$ 167.0	$ 2.4	$ 148.4	$ 3.4
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.6
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.3	$ 660.0	$ 15.1
Total		**$ 14,246.1**	**$ 206.8**	**$ 10,064.8**	**$ 231.0**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 642.5	$ 9.3	$ 656.5	$ 15.1
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,884.4	$ 70.9	$ 3,871.4	$ 88.8
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -	$ -	$ -
Total		**$ 5,526.9**	**$ 80.2**	**$ 4,528.0**	**$ 103.9**

C@L Costs and Benefits – SREC Uncapped

Benefits

C/B Component ↓	CB Code	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,157.3	$ 49.6
Ongoing O&M + Insurance Costs	CB1.2	$ 631.5	$ 14.5
Lease Payments	CB1.3	$ 223.4	$ 5.1
PILOTs / Property Taxes	CB1.4	$ 160.7	$ 3.7
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 761.2	$ 17.5
Federal Incentives (ITC)	CB1.7a	$ 188.7	$ 4.3
Displaced RPS Class I Compliance Costs	CB2.3	$ 893.5	$ 20.5
Generation Value of On-site Generation	CB3.1	$ 908.1	$ 20.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 5.8	$ 0.1
Offsetting On-site Usage	CB4.1	$ 51.9	$ 1.2
Virtual NM	CB4.2	$ 1,496.4	$ 34.4
Wholesale Market Sales	CB4.3	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 64.4	$ 1.5
Avoided Generation Capacity Costs	CB5.3	$ 1,627.1	$ 37.4
Avoided Transmission Tariff Charges	CB5.5	$ 148.2	$ 3.4
Avoided Trans. Investment - Remote Wind	CB6.1	$ 112.5	$ 2.6
Avoided Environmental Impacts	CB7.1	$ 660.0	$ 15.2
Total		**$ 10,090.7**	**$ 231.8**

Costs

C/B Component ↓	CB Code	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 332.8	$ 7.6
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,812.7	$ 87.6
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ -	$ -
Total		**$ 4,145.4**	**$ 95.2**

C@L Costs and Benefits – Policy A Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,632.4	$ 37.4	$ 2,139.6	$ 47.9
Ongoing O&M + Insurance Costs	CB1.2	$ 813.2	$ 11.5	$ 607.7	$ 13.6
Lease Payments	CB1.3	$ 304.3	$ 4.3	$ 222.7	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 156.8	$ 3.5
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 668.3	$ 9.5	$ 590.2	$ 13.2
Federal Incentives (ITC)	CB1.7a	$ 200.3	$ 2.8	$ 187.7	$ 4.2
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,552.6	$ 22.0	$ 961.4	$ 21.5
Generation Value of On-site Generation	CB3.1	$ 1,721.8	$ 24.4	$ 993.7	$ 22.2
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 10.1	$ 0.1	$ 6.3	$ 0.1
Offsetting On-site Usage	CB4.1	$ 71.6	$ 1.0	$ 51.3	$ 1.1
Virtual NM	CB4.2	$ 1,194.8	$ 17.0	$ 1,199.3	$ 26.8
Wholesale Market Sales	CB4.3	$ 888.1	$ 12.6	$ 239.3	$ 5.4
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,222.3	$ 31.5	$ 1,630.4	$ 36.5
Avoided Transmission Tariff Charges	CB5.5	$ 172.6	$ 2.4	$ 148.4	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 13,603.7**	**$ 193.1**	**$ 9,971.7**	**$ 223.1**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 1,249.0	$ 17.7	$ 765.6	$ 17.1
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,589.4	$ 65.2	$ 3,838.8	$ 85.9
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 197.4	$ 2.8	$ 63.5	$ 1.4
Total		**$ 6,035.8**	**$ 85.7**	**$ 4,667.9**	**$ 104.4**

C@L Costs and Benefits – Policy A Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,619.5	$ 37.3	$ 2,135.9	$ 47.8
Ongoing O&M + Insurance Costs	CB1.2	$ 562.7	$ 8.0	$ 550.2	$ 12.3
Lease Payments	CB1.3	$ 203.8	$ 2.9	$ 198.1	$ 4.4
PILOTs / Property Taxes	CB1.4	$ 146.8	$ 2.1	$ 142.9	$ 3.2
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 688.7	$ 9.8	$ 641.8	$ 14.4
Federal Incentives (ITC)	CB1.7a	$ 200.6	$ 2.9	$ 188.5	$ 4.2
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,515.0	$ 21.5	$ 949.6	$ 21.3
Generation Value of On-site Generation	CB3.1	$ 1,471.1	$ 20.9	$ 933.1	$ 20.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 9.0	$ 0.1	$ 6.0	$ 0.1
Offsetting On-site Usage	CB4.1	$ 92.3	$ 1.3	$ 55.6	$ 1.2
Virtual NM	CB4.2	$ 2,519.7	$ 35.8	$ 1,537.1	$ 34.4
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,220.7	$ 31.6	$ 1,629.0	$ 36.5
Avoided Transmission Tariff Charges	CB5.5	$ 172.3	$ 2.5	$ 148.2	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 13,369.1**	**$ 190.1**	**$ 9,952.8**	**$ 222.9**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 1,083.1	$ 15.4	$ 589.3	$ 13.2
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,080.3	$ 58.0	$ 3,696.4	$ 82.8
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 108.1	$ 1.5	$ 61.8	$ 1.4
Total		**$ 5,271.6**	**$ 75.0**	**$ 4,347.5**	**$ 97.3**

C@L Costs and Benefits – Policy B Capped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,614.3	$ 37.1	$ 2,136.2	$ 47.8
Ongoing O&M + Insurance Costs	CB1.2	$ 841.7	$ 11.9	$ 617.5	$ 13.8
Lease Payments	CB1.3	$ 299.1	$ 4.2	$ 222.4	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 204.3	$ 2.9	$ 157.5	$ 3.5
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 708.6	$ 10.1	$ 599.4	$ 13.4
Federal Incentives (ITC)	CB1.7a	$ 198.9	$ 2.8	$ 187.3	$ 4.2
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,555.7	$ 22.1	$ 960.7	$ 21.5
Generation Value of On-site Generation	CB3.1	$ 1,719.3	$ 24.4	$ 981.1	$ 21.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 9.9	$ 0.1	$ 6.3	$ 0.1
Offsetting On-site Usage	CB4.1	$ 65.9	$ 0.9	$ 49.9	$ 1.1
Virtual NM	CB4.2	$ 1,194.8	$ 17.0	$ 1,199.3	$ 26.8
Wholesale Market Sales	CB4.3	$ 885.5	$ 12.6	$ 248.0	$ 5.5
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,219.7	$ 31.5	$ 1,630.6	$ 36.5
Avoided Transmission Tariff Charges	CB5.5	$ 172.2	$ 2.4	$ 148.6	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 13,636.7**	**$ 193.6**	**$ 9,981.7**	**$ 223.3**

Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 1,101.2	$ 15.6	$ 736.4	$ 16.5
Direct Incentives (e.g., SRECs)	CB2.1	$ 4,419.7	$ 62.7	$ 3,824.0	$ 85.5
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 85.3	$ 1.2	$ 30.3	$ 0.7
Total		**$ 5,606.2**	**$ 79.6**	**$ 4,590.7**	**$ 102.7**

C@L Costs and Benefits – Policy B Uncapped

Benefits

C/B Component ↓	CB Code	2500 MW NPV Benefits (Million $)	2500 MW NPV $/MWh Benefits	1600 MW NPV Benefits (Million $)	1600 MW NPV $/MWh Benefits
System Installed Costs	CB1.1	$ 2,635.2	$ 37.5	$ 2,140.3	$ 47.9
Ongoing O&M + Insurance Costs	CB1.2	$ 873.8	$ 12.4	$ 624.7	$ 14.0
Lease Payments	CB1.3	$ 299.1	$ 4.3	$ 222.0	$ 5.0
PILOTs / Property Taxes	CB1.4	$ 213.2	$ 3.0	$ 159.5	$ 3.6
ROI (Aggregate Return to Debt & Equity)	CB1.5	$ 575.7	$ 8.2	$ 651.0	$ 14.6
Federal Incentives (ITC)	CB1.7a	$ 200.2	$ 2.8	$ 188.4	$ 4.2
Displaced RPS Class I Compliance Costs	CB2.3	$ 1,520.2	$ 21.6	$ 950.2	$ 21.3
Generation Value of On-site Generation	CB3.1	$ 1,488.6	$ 21.2	$ 934.5	$ 20.9
Other Retail Bill Components (Trans., EE, RE)	CB3.4	$ 8.7	$ 0.1	$ 6.0	$ 0.1
Offsetting On-site Usage	CB4.1	$ 82.6	$ 1.2	$ 53.4	$ 1.2
Virtual NM	CB4.2	$ 2,231.3	$ 31.7	$ 1,476.7	$ 33.1
Wholesale Market Sales	CB4.3	$ -	$ -	$ -	$ -
Wholesale Market Price Impacts - Energy	CB5.1	$ 54.4	$ 0.8	$ 64.4	$ 1.4
Avoided Generation Capacity Costs	CB5.3	$ 2,220.0	$ 31.6	$ 1,629.2	$ 36.5
Avoided Transmission Tariff Charges	CB5.5	$ 172.2	$ 2.4	$ 148.3	$ 3.3
Avoided Trans. Investment - Remote Wind	CB6.1	$ 181.8	$ 2.6	$ 112.5	$ 2.5
Avoided Environmental Impacts	CB7.1	$ 710.8	$ 10.1	$ 660.0	$ 14.8
Total		**$ 13,467.7**	**$ 191.6**	**$ 10,021.1**	**$ 224.4**

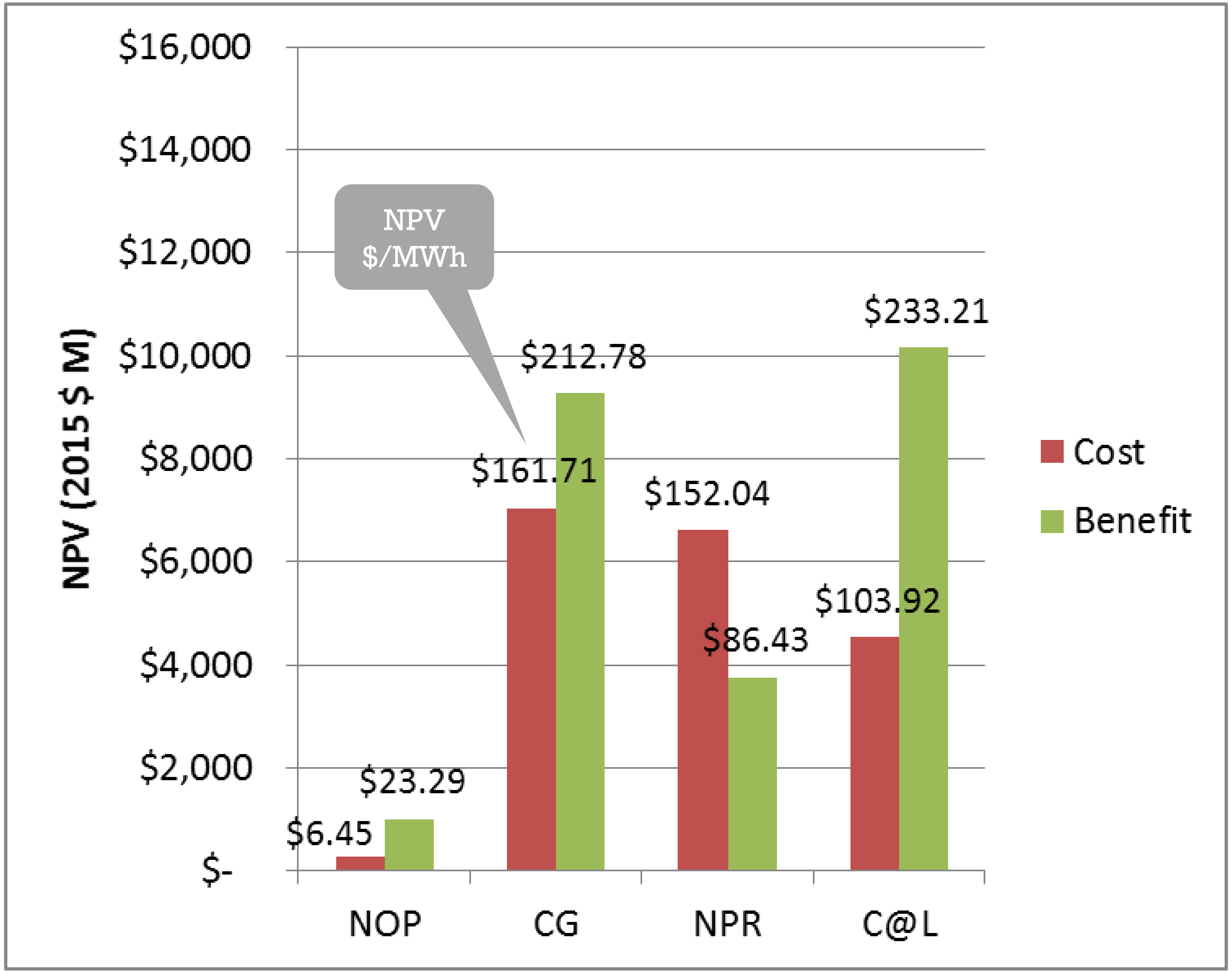
Costs

C/B Component ↓	CB Code	2500 MW NPV Costs (Million $)	2500 MW NPV$/MWh Costs	1600 MW NPV Costs (Million $)	1600 MW NPV $/MWh Costs
Federal Income Taxes	CB1.7b	$ 1,235.2	$ 17.6	$ 634.0	$ 14.2
Direct Incentives (e.g., SRECs)	CB2.1	$ 3,668.6	$ 52.2	$ 3,599.4	$ 80.6
Solar Policy Incr. Admin. & Transaction Costs	CB2.4	$ 85.1	$ 1.2	$ 30.2	$ 0.7
Total		**$ 4,989.0**	**$ 71.0**	**$ 4,263.7**	**$ 95.5**

COST & BENEFIT RESULTS

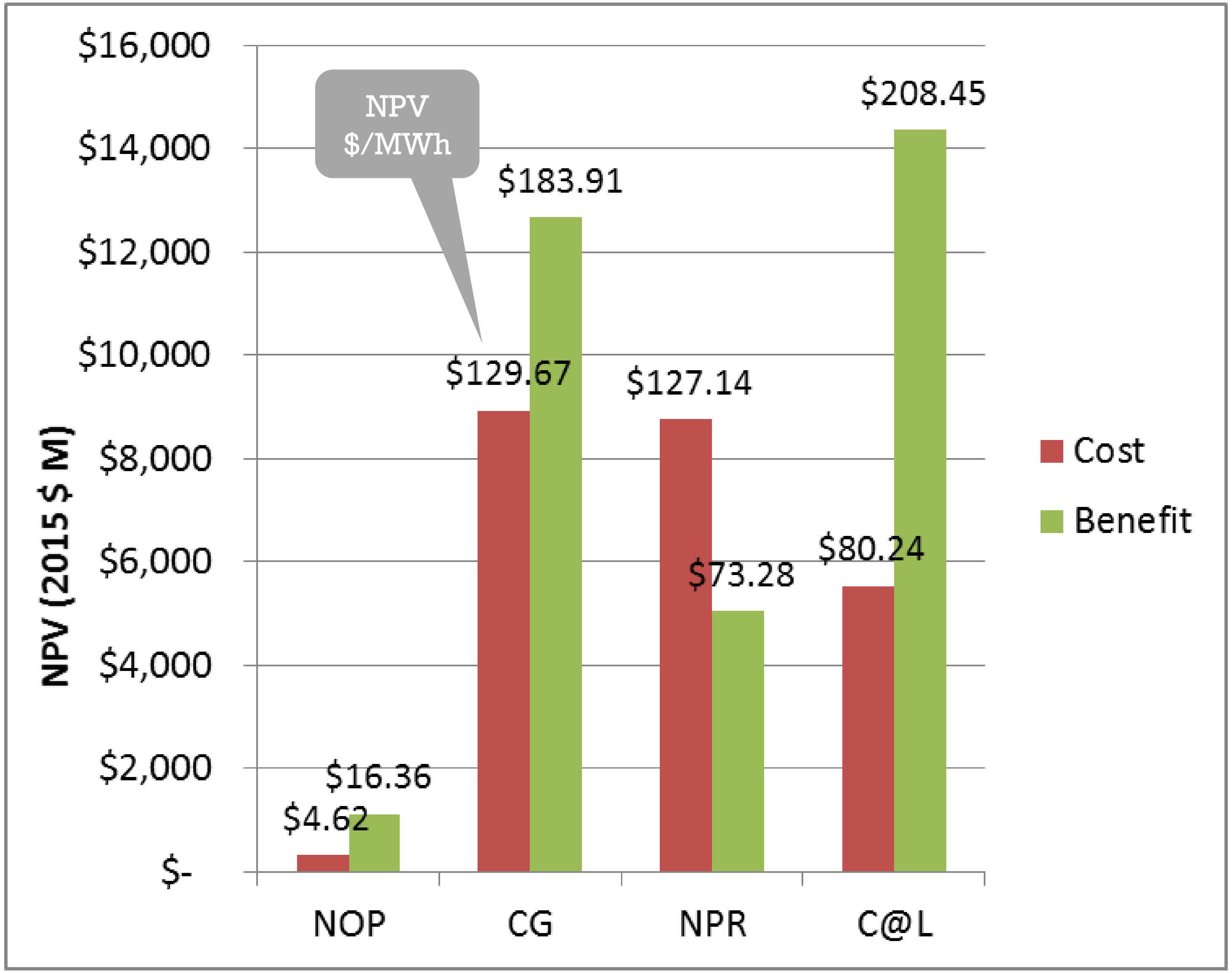
CURRENT POLICY

Costs & Benefits under Current (SREC) Policy:
NM Capped (1600 MW)



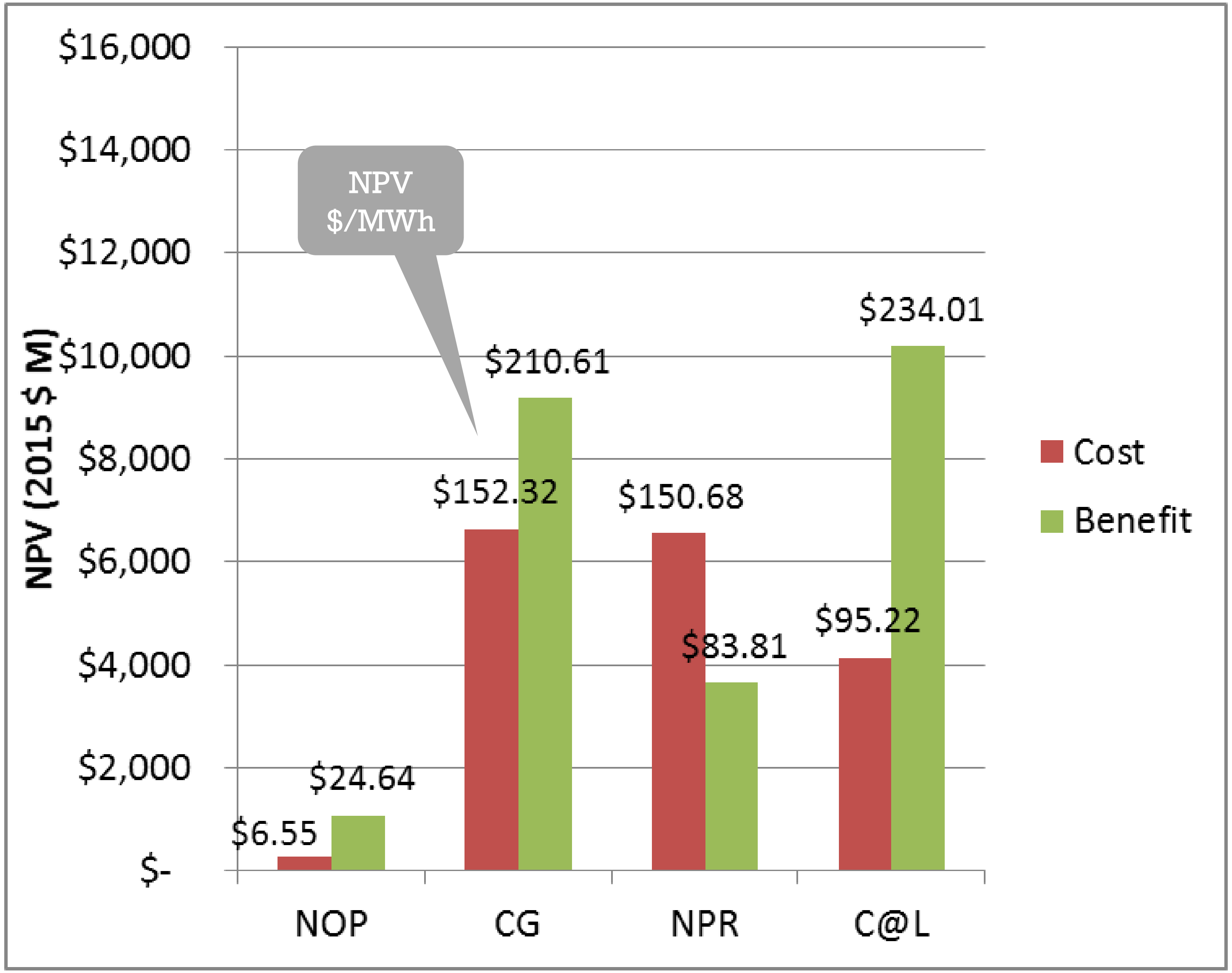
	NPV (2015 $ M)		NPV $/MWh	
Cost				
NOP	$	281	$	6.45
CG	$	7,046	$	161.71
NPR	$	6,625	$	152.04
C@L	$	4,528	$	103.92
Benefit				
NOP	$	1,015	$	23.29
CG	$	9,272	$	212.78
NPR	$	3,766	$	86.43
C@L	$	10,162	$	233.21

Costs & Benefits under Current (SREC) Policy:
NM Capped (2500 MW)



	NPV (2015 $ M)	NPV $/MWh
Cost		
NOP	$ 318	$ 4.62
CG	$ 8,932	$ 129.67
NPR	$ 8,758	$ 127.14
C@L	$ 5,527	$ 80.24
Benefit		
NOP	$ 1,127	$ 16.36
CG	$ 12,668	$ 183.91
NPR	$ 5,048	$ 73.28
C@L	$ 14,358	$ 208.45

Costs & Benefits under Current (SREC) Policy:
NM Uncapped (1600 MW)



	NPV (2015 $ M)	NPV $/MWh
Cost		
NOP	$ 285	$ 6.55
CG	$ 6,631	$ 152.32
NPR	$ 6,560	$ 150.68
C@L	$ 4,145	$ 95.22
Benefit		
NOP	$ 1,073	$ 24.64
CG	$ 9,169	$ 210.61
NPR	$ 3,649	$ 83.81
C@L	$ 10,188	$ 234.01

QUALITATIVE ANALYSIS OF COST AND BENEFIT ITEMS NOT QUANTIFIED

RCG to set up a table to step through these

- *** set up a table to step through these